Virginia MEDICAL MONTHLY

OFFICIAL PUBLICATION OF THE MEDICAL SOCIETY OF VIRGINIA

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1. Fauley, G. B., Freeman, S., Ivy, A. C., Atkinson, A. J. and Wigodsky, H. S.: Aluminum Phosphate in the Therapy of Peptic Ulcer, Arch. Int. Med., 67:563-578 (Mar.) 1941.
2. Cornell, A., Hollander, F. and Winkelstein, A.: The Efficacy of the Drip Method in the Reduction of Gastric Acidity, Am. J. Digest. Dis., 9:332-338 (Oct.) 1942.
3. Winkelstein, A., Cornell, A. and Hollander, F.: Intragastric Drip Therapy for Peptic Ulcer; Summary of 10 Years' Experience, J.A.M.A., 120:743-745 (Nov. 7) 1942.
4. Upham, R., and Chaikin, N. W.: A Clinical Investigation of Aluminum Phosphate Gel, Rev. of Gastroenterol., 10:287-297 (Nov.-Dec.) 1943.
5. Lichstein, J., Simkins, S. and Bernstein, M.: Aluminum Phosphate Gel in the Treatment of Peptic Ulcer. Am. J. Digest. Dis. In Press.

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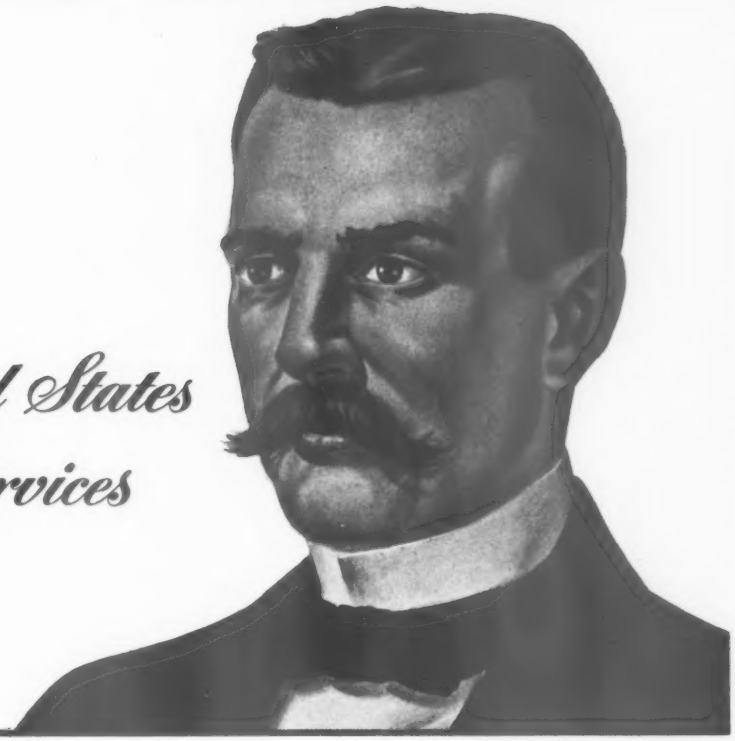

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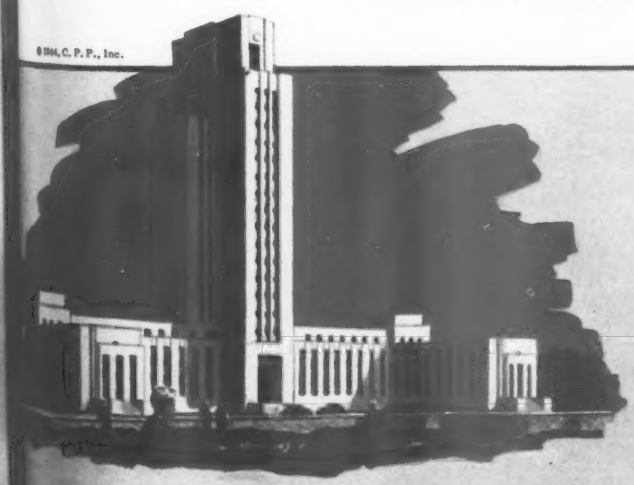

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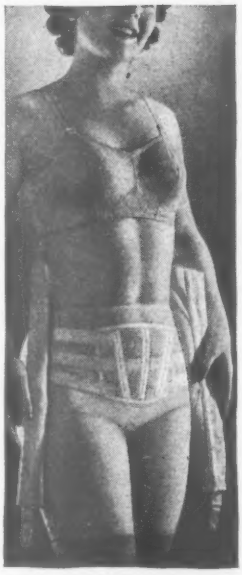

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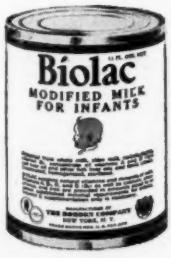

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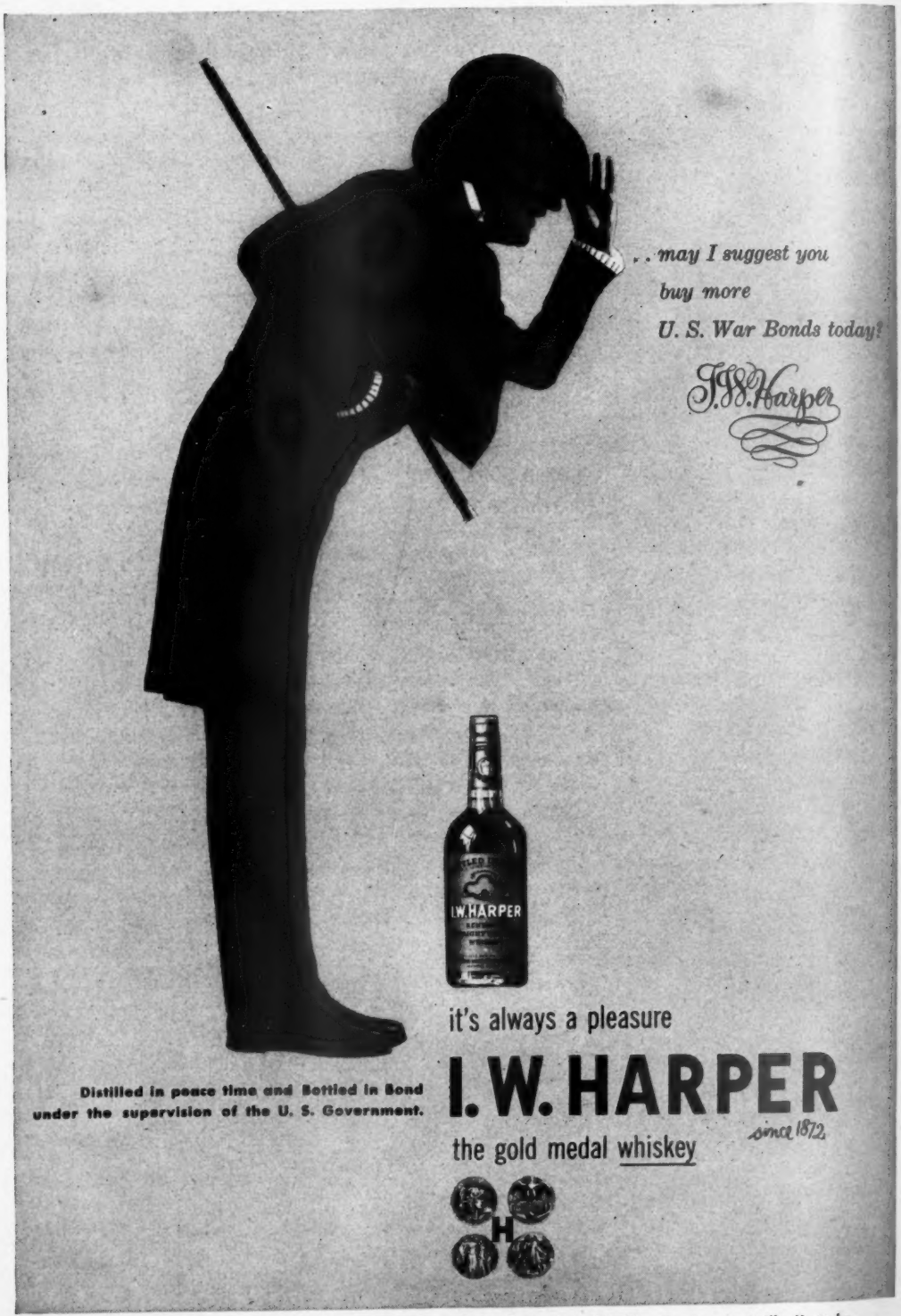
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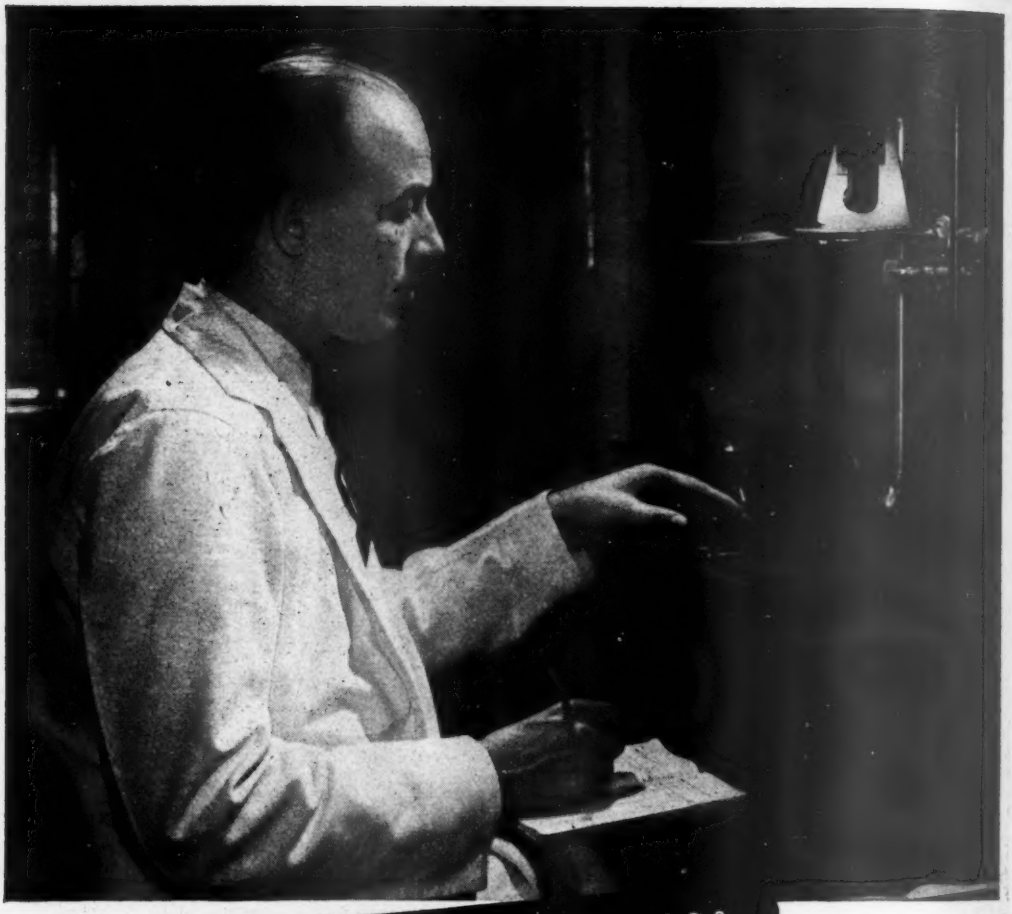

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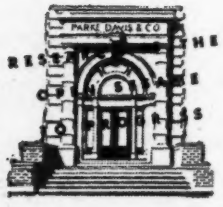

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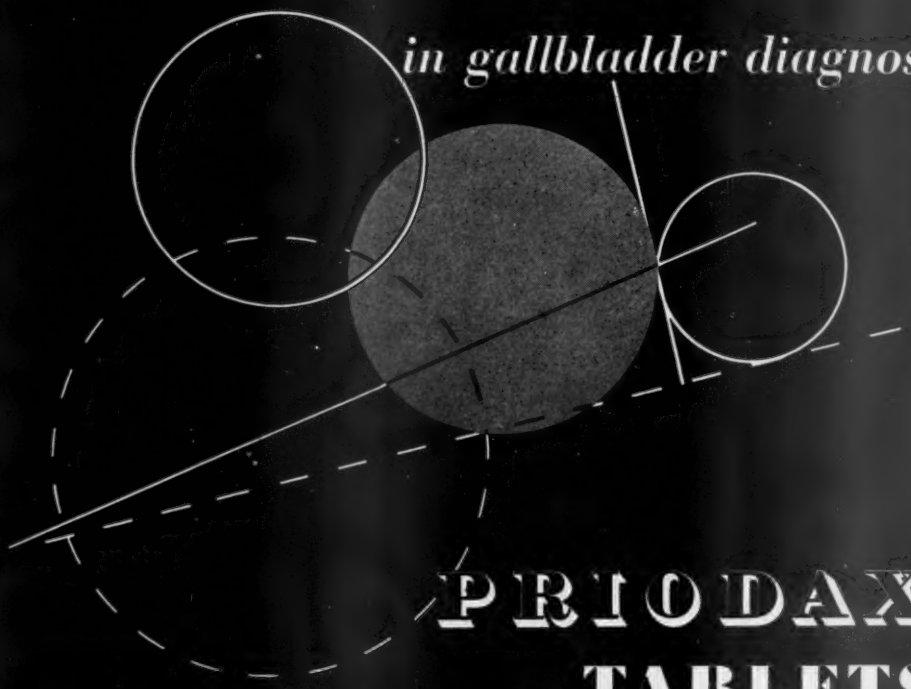

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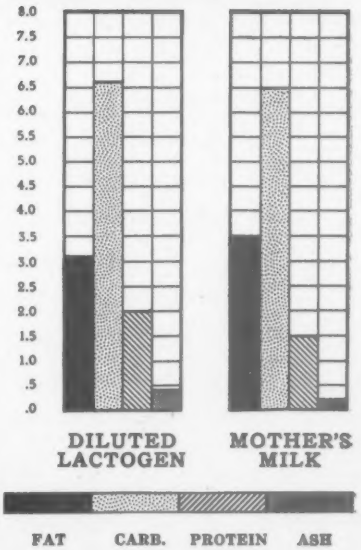

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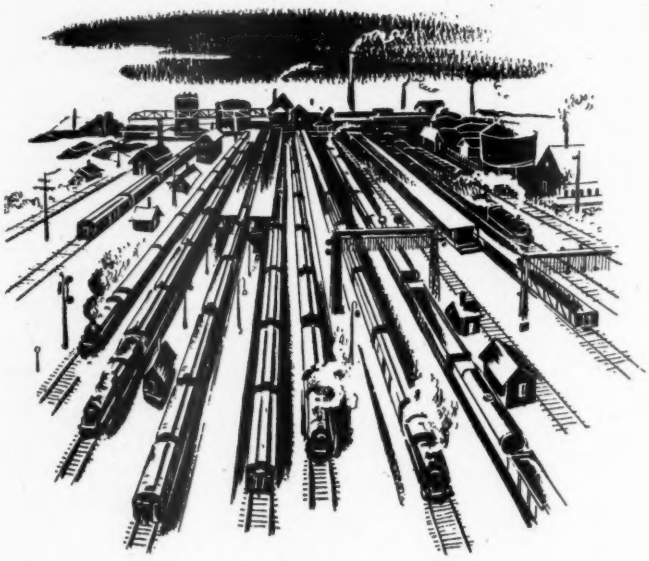

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Guest Editorial

Rural Medical Care

AT a State meeting of a Virginia farm organization a few years ago there was strong support of a resolution requesting the Legislature to reduce by law the length of the course for medical students. This resolution sprang from a belief that a reduction in the cost of medical education might result in more doctors and a lowering of charges. Misguided ignorance, you say. Certainly, but an indication of a real problem. These farm representatives knew, many of them through bitter personal experience, that with the passing of the old open-country doctors, it is becoming increasingly hard for country people to secure needed medical care promptly and at a cost in keeping with their meager income. Such conditions finally prompted the Virginia Farm and Home Organizations, representing about 50,000 farm families, to unitedly request the Legislature to set up a commission to make a thorough study of rural health and medical care problems. After such a request had been turned down at two succeeding sessions of the Legislature, the Virginia Federation of Home Demonstration Clubs, an organization of about 25,000 farm women, asked the Division of Rural Sociology of the Virginia Agricultural Experiment Station to make the desired study. The first step in this undertaking was the formation of a Sponsoring-Advisory Committee composed of officially appointed representatives of the Medical Society of Virginia, the two Medical schools, the State Department of Health and other State agencies concerned with rural life, and the Statewide farm and home organizations. The first chairman of this Committee was Dr. John Hundley, the Medical Society representative, who, after he went into the Army, was succeeded by Dr. J. R. Gorman, and then the present chairman, Dr. H. B. Mulholland. The Executive Committee of this group includes besides the Chairman, Dr. H. B. Mulholland, Assistant Dean, University of Virginia Medical School, President W. T. Sanger, Medical College of Virginia, Dr. L. J. Roper, State Department of Health, Mr. Raymond Long, Director State Planning Board, and W. E. Garnett, Virginia Agricultural Experiment Station.

Before the Experiment Station study could get under way, the many questions related to the medical care of the indigent prompted the State Department of Public Welfare and the State Department of Health to ask the U. S. Public Health Service to make a study of Virginia's "Medically Needy", and related medical services. Dr. Louis S. Reed, who had charge of this undertaking, asked that his work should be considered a part of the program of the Sponsoring Committee of the rural Health and Medical Care Study. The field work for both studies was begun in the summer of 1941, but the completion of reports has been delayed by war conditions. Final reports will be published shortly by the U. S. Public Health Service and the Virginia Agricultural Experiment Station. Several progress reports have been issued, which are available

for the asking from the Division of Rural Sociology, Virginia Agricultural Experiment Station, Blacksburg, Virginia.

As the rural Health and Medical Care Study neared completion, it became evident that remedial measures for at least part of the undesirable conditions would depend on State action. Accordingly the Governor and the 1944 Legislature were asked to provide for a committee of the Legislative-Advisory Council to consider problems of rural health and medical care. Such a committee is being appointed under the chairmanship of the Hon. Charles R. Fenwick of Arlington County.

RURAL MEDICAL CARE NEEDS

Thoughtful observers of trends in the medical world, especially those close to the rural situation, have long known that rural people are not generally receiving the full benefits of advancing medical science and techniques and that the system of medical care for rural people is not being sufficiently adapted to the changing situation. The findings of the studies in question are, therefore, not especially new to such observers. However, they serve to bring certain Virginia conditions into sharper focus. Among the more significant of such conditions are:

The Poor Distribution of Doctors—According to the 1942 Medical Directory, there are now less than 2,000 effective practicing physicians in Virginia or a ratio of approximately one doctor to 1,365 people. This is not so bad if they were evenly distributed. In 11 rural counties, the number of effective doctors is one to over 7,000 population as compared to a ratio in 1940 of around one doctor to 520 people in the cities and one to 720 in the cities and city-counties together. With the tendency for doctors to concentrate in cities and towns, many thousand rural families are now a long distance from a doctor. Where the charge is $1.00 per mile, as is customary with many town doctors, many rural families have to pay from $5 to $10 or even more for a home visit.

Cost of Medical Care Out of Proportion to Farm Incomes—Reports from approximately 2,400 widely distributed rural Virginia families in 1941-42 indicated an average expenditure for all types of medical care of around $60 per year, with about 90 per cent having some type of medical care expenditure. A detailed report from 632 of these families showed average expenditures for given items as follows:

Doctor	$23—401	families	63%	Hospital	$114— 89	families	14%
Nurse	$25— 30	"	5%	Eye Ex. & Glasses	$ 21—167	"	26%
Dental Work	$19—311	"	49%	Drugs	$ 10—397	"	63%

For the country as a whole, approximately one person in 10, is reported to have hospital treatment each year, with 47.7 per cent of hospital admissions for operations. In 1929 the medical care dollar was reported to have been spent as follows:

Physicians	29.8%	Hospitals	18.2%	Drugs	18.2%
Nurses	5.5%	Dental Work	12.2%	Other purposes	7.6%
		Public Health	3.3%		

The average net farm income of Virginia farm operators in 1939 was reported at $463. The average yearly income of the State's approximately 50,000 farm wage earning families was even less. In 1939 approximately three Virginia farm operators in five had a gross farm income of under $600, but this does not cover earnings from nonfarm work received by about one-third. Gross farm incomes include the value of home produced supplies, exclusive of rent, and also the expenses of farm operation. Farm incomes have increased somewhat since 1939 but such increases are in part offset by increased cost.

Rural Doctors Make Insufficient Incomes—Even though the cost of medical care is excessive for many meager income rural families, reports from 231 rural doctors showed the annual net professional income of over half as averaging less than $3,000 per year. No wonder doctors go to urban centers where they can make incomes more in keeping with their expensive training and where they can have many advantages lacking in the average rural community.

Rural People Frequently Go Without Needed Medical Care—The scarcity of doctors and the high cost of medical care has resulted in a tendency for rural people to have a doctor only in case of extreme necessity. Thus, reports from 1,739 white and 767 Negro families indicated that, because of the cost, one in 14 of the white and one in 4 of the Negro families did not have a doctor when he was thought to be needed, while one in 20 of the whites and one in 7 of the Negroes did not have needed operations or hospital care for the same reason. The poorer families reported much more incapacitating sickness than those of higher income, but smaller expenditures for medical care. The number of poorer families reporting some form of chronic ailment was astonishingly high. Many such ailments appeared to be traceable to the cumulative consequences of inadequate medical care when needed. Most rural doctors can cite a number of such cases.

Unfavorable Virginia Showing—Although Virginia has made great strides in its public health work and other phases of medicine, this State still makes an unfavorable showing in comparison with the country as a whole in a number of items. Thus in 1940 for live birth children under one year of age, Virginia's death rate was 8 above the national average, with 31 states making a better showing in this significant index of health care. In the same year, Virginia's death rate for all forms of tuberculosis among whites was 12.2 above the national average with 40 states having a lower rate.

The country generally has been startled and disturbed by the high percentage of prospective soldiers rejected because of physical defects. Full state comparisons in this regard are not yet available for the present draft. However, in the First World War, Virginia was in the three states with the highest rate of total defects for the 20-odd points covered by the examination. Virginia's poor showing in these items is not altogether due to the lack of adequate medical care but is in part due to unfavorable living conditions. Approximately 100,000 white Virginia rural families have marginal standards in regard to income, education, housing and other living conditions—families which are producing at least one-third more children than an equal number with higher standards. A recent study of the diets of 5,000 Virginia school children showed one-third to be 50 per cent or more below accepted standards for essential foods.

IMPROVEMENT MEASURES

The following principles are being used as a guide by the Sponsoring-Advisory Committee of the Virginia Rural Health and Medical Care Study in its efforts to develop measures for improvement of the rural medical care situation:

The benefits of modern medical knowledge and techniques should be made available to all people regardless of place of residence or income status. The attainment of this end involves evolution to broader concepts of medical care. Adequate medical care and good health, like minimal standards of education, are of sufficient social importance to justify such action as may be necessary to insure such minimal care.

Regardless of how provided, all families wherever possible should make a reason-

able contribution to the cost of their medical and hospital care, and all hospital insurance and medical care plans should be on a sound actuarial basis.

Any medical care and hospitalization plans used should not violate the principle of direction by competent medical authority or of accepted standards of doctor-patient relations.

The distribution of doctors is of fundamental importance to the solution of the problem of adequate rural medical care. A distribution of doctors adapted to rural needs is dependent upon (a) young doctors trained in modern laboratory techniques having hospital connections, or other suitable access to needed equipment without excessive cost; (b) more stimulating professional associations, and (c) assurance of a reasonable income.

Improvement in the rural medical care situation had best come through an experimental evolutionary process rather than attempts to change medical procedures all at once. It cannot be entirely separated from other related situations and problems.

Among the specific measures recommended by the Committee are:

That the State employ outside experts, possibly through aid from the U. S. Public Health Service, to make a study of the needs of new hospital centers, especially in areas not now properly served by existing hospitals, such experts to work in conjunction with local leaders.

That the Commonwealth of Virginia establish upon expert advice, a plan for hospitalization adapted to the needs of lower income groups. It is thought that increased State and county support will be necessary in any adequate plan.

That pending the development of a more comprehensive plan for rural medical and hospital care all possible encouragement be given to the extension of hospital insurance and prepaid medical care plans among rural people of the more favored income groups. Most available hospital insurance plans, except that of the Farm Security Administration sponsored Virginia Farmer's Health Association, are too costly for the average farm family.

The Committee also recommended that there be a vigorous campaign of public opinion education as to (a) the facts regarding the rural medical situation as revealed by the research studies (b) possible improvement measures, and (c) factors to be taken into account and the difficulties to be overcome in developing improvement measures and getting them into operation.

A committee headed by Mrs. Ben Wailes of Sweet Briar, representing over a dozen Statewide organizations, already has plans under way for such a public opinion campaign to be concentrated in May, 1945. The supporting State organizations have over 2,000 community locals which are expected to devote at least one meeting to questions related to better rural health and medical care. It is hoped all the local medical societies of the State will do likewise.

W. E. GARNETT, PH.D.

EDITOR'S NOTE.—Dr. Garnett is Rural Sociologist with the Virginia Agricultural Experiment Station at Blacksburg, Virginia, and Director, Virginia Rural Health and Medical Care Study.

PHYSICIANS, WAKE UP!*

C. B. BOWYER, M.D.,
Stonega, Virginia.

INTRODUCTION

As the world's greatest drama of war approaches a successful climax and plans for the peace are being made, there is now much to be done in the transition from war-time to peace-time, to make a better, happier world, focused around social security, freedom from want, adequate health service for all, to justify the great sacrifice America has made.

In this new trend of thinking, social planners feel strongly that medicine should be so reorganized and so regulated, by Federal legislation if necessary, as to provide a better distribution of medical care for all at lower cost, on some universal pre-payment plan. A little over a year ago President Roosevelt said, "for all our citizens we should provide a further measure of social security in order to protect them against certain continuing hazards of life." Following this statement various Federal agencies have proposed plans. When analyzed all of these plans seem to indicate that the agencies drawing them are more interested in having their particular plans adopted than they are in the successful, lasting benefit of such plans as they affect our people as a whole. With all of the social thinking and planning following the horrors, suffering, and devastation of a global war, the American public is becoming increasingly social security conscious. Our law makers are acutely aware of this awakening on the part of the public and many legislative "cure-alls" are being suggested. The one in which we as physicians are the most interested is the plan to regiment the medical profession. That we do have serious problems facing the profession no one can deny but Federal legislation, enormous money spending programs, and added taxation is not the answer. From earliest records of man there has always been insecurity, poverty, and disease, and regardless of any program there always will be. However, we as physicians must wake up and follow the trend of public thinking or we shall be *forced* to do so. So, I repeat, "Physicians, wake up!".

*Address of the President at the annual meeting of the Medical Society of Virginia in Richmond, October 23-25, 1944.

THE PROBLEM

We today face changes which must be given the serious consideration of every physician. Study the platforms adopted in Chicago by both the Democratic and the Republican party. What do we find? Strong emphasis on the health needs of our people. This is significant. Our present system of medicine evidently does not adequately protect or minister to the needs of our people. I believe each of us is willing to concede that our system needs to be better planned, or even drastically re-vamped. All of us are painfully aware that, despite the great strides made in our medical centres in both preventive and curative medicine and surgery, we do have, not only in Virginia, but throughout the country as a whole, rural sections badly in need of adequate medical care and hospitalization. Is State or Federal control the answer to this problem? I think not. However, unless we take cognizance of these needs as a profession we shall certainly be forced into some sort of a State or Federal system not to our liking.

WHY STATE OR FEDERAL PLAN NOT FEASIBLE

First, medicine cannot be changed nor the system revolutionized by precipitate action because medical service is not static. When a diploma is granted, an internship certificate awarded, the recipient thereof is not "finally" prepared. You cannot have best medicine if we surrender freedom of initiative to government control. You must not curb medical aspirations or research genius. Medicine is not a standardized commodity to be passed down through the years with little change. It cannot be bought in bulk and retailed to patients in need of service. It is utterly impossible for one industrialist or group of industrialists, for one doctor or group of doctors, for one legislator or group of legislators to come forth with a satisfactory plan which will cover all conditions and classes of people. Our system of medicine, to which we may pardonably point with pride, is the result of years of planning and growth. Fundamental principles and established procedures cannot be changed overnight to a workable plan either by aggressive thinkers or by State or Federal

laws. A workable plan will require much time by many people. However, the time for action is now, or Federal medicine will become a reality in America.

OUR SHORTCOMINGS

Despite the trend in the thinking of the public, we as a profession have refused to see "the handwriting on the wall." We cannot continue this ostrich-like attitude. Empires have fallen because rulers refused to lend an ear to the voice of the people. Some of us say we cannot be robbed of our "private" enterprise, or our "personal initiative" threatened. History has taught us that *anything* can happen *anywhere* if the people of *any* nation are sufficiently aroused. Some of us say that it is absurd to think of medicine becoming a political football. I concede this point but at the same time unless we as a group put forth a sound, practicable plan for adequate medical care and hospitalization for our people we are in danger of being made just that. It is all right for us to praise our scientific and educational work and our contributions to the advancement of medicine but that does not answer America's question, "WHY CANNOT WE HAVE ADEQUATE MEDICAL AND HOSPITAL CARE WITHIN THE REACH OF EVERY MAN, WOMAN AND CHILD?" That question is being all but shouted from the rooftops; IT MUST BE ANSWERED: We must go with the current of public opinion and not just drift with the tide. OURS MUST BE THE INITIATIVE: We may consider medicine as ours, to do with as we please, but we know deep in our hearts that we must be governed by the wishes of our people as a whole. Today as never before this Society and we as individuals are being called upon to make outstanding contributions to the advancement of medicine. We have advanced medicine as a science but we have sadly neglected the economics of medicine, public relations, and better distribution of physicians. We are now face to face with the threat of regimentation and we must come forth with a far-reaching plan to improve our present-day system of distribution. We must assume leadership in providing proposed facilities for insuring against the hazards of sickness and the cost of hospital care. We have gone a long way in preventive and curative medicine but we have failed woefully in adapting medicine to the changing pattern of living.

COOPERATION OF THE PROFESSION IMPERATIVE

As previously stated, there are many unsatisfactory features in present-day medicine, the two most important being (1) the high cost of medical care, and, (2) lack of adequate medical care and hospital facilities for those in the lower income brackets and for our rural population. Any plan to furnish adequate curative treatment, sound preventive measures, and good hospital facilities must be worked out jointly by the medical profession and those interested in a practicable plan. Any plan to make America a stronger, healthier, happier nation, to be successful must be planned and supervised with the aid of the medical profession. The fundamental principles on which our system of medicine was founded must be preserved as they are vital to the growth and continued scientific development of medicine and surgery. On the economic side as well, guidance must be under the medical profession. We cannot have preventive and curative medicine furnished by one group and the economics of medicine handled by another. Curative and economic medicine must be studied together, planned together, and any plan proposed *must give the patient free choice.* This is a democratic principle which must be preserved. In any plan for better and less costly medical service this one thing must stand out above all, for in the American way personal freedom of choice comes first. The threshold of the home cannot be crossed with just any plan, governmental or otherwise, as certain personal rights must be regarded as sacred. Any program must be based on our present system of medicine with freedom of choice by the patient.

I think each of us believes that the best quality of medicine is obtainable under our present system of private practice. The principal objection is that it is not within reach of a sufficient number of our people. Therefore, we must take an active part in developing plans, or using existing facilities, to provide not only pre-payment for hospitalization but also for medical and surgical care. There are in existence many pre-payment plans which insure free choice and adequate treatment. We must devote an increasing amount of attention to the economic phase of medicine. Various medical groups are already blazing the trail in this adventure from which we can expect results. Our system of medicine and its progress is built up by the support and endorsement of society which it preserves and protects. For some reason our social reformers have gotten the wrong impression of the attitude of our profession;

some think we are attempting to be the masters in a great organization to regulate service; that we intend to dictate our policies; that we are an organization of specialists, selfish and dogmatic; that we have forgotten the Hippocratic oath. However, we are not the masters; the whole structure of our profession is based on the desire and the willingness to serve. It is not a question of master and servant; there is a great difference between *service and subjugation to the wishes and the will of others.*

Ours is the responsibility for the distribution and the "purchasability" of adequate medical care. We MUST take an active part in helping to develop a sound prepaid medical care plan which creates purchasing power through a satisfactory insurance, or pre-payment program. A practicable method of financing medical care will bring good medicine within the reach of all. I understand there are now more than thirty pre-payment medical care plans in operation under State, county, or local medical supervision. Our people must be educated to the importance and the value of pre-payment plans now available; we should not allow them to adopt the policy of "let the government do it".

MEDICINE AND INDUSTRY

Changing from war-time to peace-time needs is one of the big problems confronting us today and on its successful solution rests the progress, prosperity, and happiness of the nation. We of the profession, I fear, are not alert to the part we have an opportunity to play in switching back to peace-time conditions. On the shoulders of industry and labor rest the grave responsibility of readjustments. If our profession wishes to be a major factor in health plans, health service, and health activities of our larger industries, we must re-vamp our medical policies, medical traditions, and create a stronger relationship between capital, medicine, and labor on a sounder, more business-like basis. When we analyze the progressive work being done in health measures, accident care, treatment of occupational diseases, selection of personnel, hygienists, sanitary engineers, safety engineers, etc., we find the practicing physician has not kept abreast of industrial thinking and advancement in shaping a sound policy of medical care, although we plan to render service to the employee. Investigation has shown that health and welfare are most important factors in production. Industry is calling for medical help to solve its problem of the loss of man hours due to illness. In fact, some industrialists have already challenged the medical profession. How many of you have read "Kaiser Wakes the Doctor?", a story outlining Henry J. Kaiser's industrial medical plan? This book does not hesitate to attack our conservative medicine and our medical policies. Health in industry is not a state problem alone; it is not a public health problem; it is not a problem for social reformers; it is simply a business proposition to be settled by joint action of management, labor, and medicine. Organized labor is ever alert to improve living standards, working conditions, and health measures. It has already established a beach-head for a strong invasion on our present system of medicine if necessary. Labor is the consumer and should be recognized. Management on the other hand knows that manpower is its greatest asset. It knows that if its workmen are assured good medical care and hospitalization for themselves and their families without being forced into heavy debt, or even worse forced to seek charity, they will be contented and stable wage earners. Our profession has shown but little desire to familiarize itself with this problem. Unless we as a profession offer a workable plan to industrialists they will solve this problem in their own way whether we like it or not.

Let's consider our own State for a moment. She is fast becoming a great industrial state. Our labor, our climate, our raw materials, our health record, our compensation laws, our views on free enterprise, all appeal to capital. Who among you tonight could intelligently discuss with industrialists such questions as man power maintenance, medical policy guidance, job placement, dietary deficiency in the worker, or define occupational diseases as used in the Virginia law? Who of you could intelligently advise any industry in our State under our amended compensation act whether to provide schedule coverage or inclusive coverage against occupational diseases? Nearly 90 per cent of the compensation cases in the State involve medical questions. There are still many unsolved medical problems in connection with our Workmen's Compensation Act and these must be solved to the satisfaction of the management of industry. When industry changes the pattern and needs of society, medicine must change also. Either the industries of our State will dictate to us, or we must meet its challenge and come forth with a solution for its problems. If under our present system

of medicine we cannot offer a solution, then we must change the system or industry will arrange for medical supervision through some other agency.

During the past few years when heavy demands have been made on production, every strike has received headlines in the daily press. The country lamented the fact that production was slowed down by these strikes. Yet, the man hours lost in these same plants during the year from accident, disability, and illness which were preventable with a stronger medical care program were greater; they received little publicity. A few months ago in Roanoke, Virginia held its tenth annual State-Wide Safety Conference and in Governor Darden's message and Norman Damon's address these startling facts were revealed. Only three diseases are more deadly for all ages than accidents, and from the age of two to twenty-eight accidents lead all the rest. In 1943 our casualty list from accidents, although not as great as in some other years, was nearly 100,000 dead and about 10,000,000 injured. This meant an economic loss to our country of more than 2 per cent of our current national debt. What has medicine to do with accidents? We must have organized and concerted plans to care for these casualties; if we do not, then the State or some other agency will devise plans. Various farm organizations are also following the trend of industrial thinking for better equalization of health opportunities.

NEED OF HEALTH EDUCATION

There is an old saying, "You can't teach an old dog new tricks." So, in any plan for promoting better health we must needs go back to the child. We must bring up our citizens of tomorrow with a better understanding of adequate health standards. I strongly advocate more health instruction in our public schools. The child should be taught more about growth, development, nutrition, and body functions. The Commonwealth is now making extensive studies of our system of education and in any future plan I should like to see more thought given to health problems in the school. We have entirely too many young people finishing high school denied work in a gainful occupation because of some neglected defect or disability. Bear in mind that over 42 per cent of the first 2,000,000 men examined for military duty were rejected. Our young people must become more interested in their own health, in order for any plan of medical care to succeed. The child must be given adequate instruction with regard to food, shelter, and clothing; he must be taught the basic laws of personal hygiene and the fundamentals of health. In other words, he must be made "health conscious".

DEFERMENT OF MEDICAL STUDENTS

Our present system of medicine should continue to furnish high standards of stability and maintain the great strides thus far made in curative and scientific medicine. A cloud is now on our horizon! There will be an alarming shortage of physicians in our State and in our country in a few years if the present regulations and policies of Selective Service in regard to the status of medical students is not changed. You doubtless know that all deferments of pre-medical and medical students not now enrolled have been abolished. According to *The Journal of the American Medical Association*, "The medical schools must obtain the majority of their students for the 1945 classes from civilian sources. This means that about 70 per cent of students must be obtained from women and physically disqualified men, the other 30 per cent being the quota under control of the Army and the Navy. An editorial in *The Journal* states, "If this alarming situation is not corrected there will result an annual and cumulative deficit of 2,000 doctors a year." May I ask that you write your congressman? Miller's amended bill provides that not less than 6,000 medical students be deferred each year as necessary to maintain the health of the nation. Work for this bill!

OUR RESPONSIBILITY TO RETURNING PHYSICIANS

I wish now to turn to our duty to members of our profession. Many of our colleagues are in the armed services undergoing untold hardships. As victory appears in the offing these men will be returning home. Their return raises two problems for us: (1) We must assure every member of this Society engaged in war service opportunity to take up where he left off, and (2) provide postgraduate or "refresher" courses for returning physicians. The refugee doctor who has located in our State should be shown every consideration but our returning men should be protected first and enabled to resume their former practice.

A poll compiled by *Medical Economics* from a large number of doctors in the service, published recently, reveals the following: Ninety-five per cent

do not expect to remain in the armed services indefinitely; 64 per cent plan to resume former practice; 22 per cent are undecided; and about 60 per cent plan post-graduate work before again entering practice. These figures show that practically all plan to return to civilian practice, a large majority to their former locations.

Post-graduate education for returning men is a *must* in our planning. I am wondering if our hospital heads, our two medical schools of the Commonwealth, and this Society cannot work out and coordinate plans for a good "refresher" or post-graduate course for these men. It seems to me that this procedure would assure an adequate answer to this problem. In any plan the cooperation of our State Department of Health should be enlisted.

OUR PHYSICIANS ON THE HOME FRONT

While all of us are cognizant of the splendid service of our colleagues in the armed services, let us not forget to pay tribute to our physicians on the home front. Over 60,000 doctors have joined the armed services, over 1,000 went from Virginia, one-third of our doctors, part of whom were the cream of our profession in organizational work, in skill, and in endurance. However, those of you remaining picked up the torch and carried on! We are proud of our Virginia doctors both on the battle front and on the home front; each has served splendidly. Many of these men on the home front were denied commissions and shouldered heavy burdens. You on the home front have made a wonderful record in maintaining, yes, even raising the health standards of Virginia. A year or two ago I made a trip through my section of the State with Doctor Trout to make a survey of available doctors for military service as well as for essential civilian needs. In going through the counties, more than 50 doctors over sixty-five, some past seventy, came to us asking what they could do to help. Some were on canes and crippled with the weight of years, some bearing scars from heroic work in World War I, yet all expressed determination to help in every possible way. Our only answer to them was, "Continue the fine work you are doing but keep your britches on a little longer." Tonight I wish to pay tribute to these men and to every doctor in Virginia who has been doing double duty, risking his health, and in instances becoming a casualty in the care of our people. I know the Medical Society of Virginia will in its annals give special recognition to the splendid service of these men. If I had my way, a distinguished service medal would be pinned on their breasts! May our Society continue to develop such men and preserve the hallowed traditions of our great profession.

In closing may I summarize the points I have attempted to make:

The responsibilities of the medical profession, unless we wish to be regimented by law, are:

1. Better distribution of physicians in rural areas.
2. Adequate hospital facilities in all parts of our country.
3. A practicable plan of pre-payment for medical, surgical, and hospital care within the reach of those in the lower income brackets.
4. Better health instruction in our public schools.
5. Cooperation with industry in its medical problems; more emphasis in our medical schools on industrial medicine.
6. Opportunities for post-graduate education for our returning physicians and aid in re-locating for practice.
7. Maintenance of high standards of medical accomplishment, including support of plans to insure sufficient medical students to become the doctors of the future.

From my viewpoint these things must be done if we as a profession continue to hold our place in the world of tomorrow. In these war-time years, many have given their lives for America. We are called upon only to do our part in caring for the health of her people. We can do no less than answer the clarion call for better health service for all.

RECENT ADVANCES IN ELECTROCARDIOGRAPHY: AN EARLIER OBJECTIVE DIAGNOSIS OF ANGINA PECTORIS

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In many instances the interpretation of precordial pain, particularly in the neurotic patient,[1] presents one of the most difficult present-day medical problems. In the relatively young individual an accurate objective evaluation of the cardiac status is imperative. Furthermore, in older persons the differential diagnosis involving angina pectoris and various other conditions is not always objective or without difficulty.

All too frequently patients are seen who illustrate two extremes in diagnosis encountered in this condition. One is the "cardiac invalid" with a normal cardiovascular system; the other is the patient with arteriosclerotic heart disease whose life and usefulness have been shortened because of poor management in the early stages of the disease.[2, 3, 4, 5] Much of this uncertain management is due to the unjustified pessimism with which angina pectoris is regarded.

Recent studies by White[2] reveal a more encouraging prognosis and a new conception of coronary artery disease, placing the old fatalistic attitude in a more unjustified position. This new conception is that coronary artery disease is mainly "an acute or subacute rather than a chronic disease, though frequently with recurrency".[2] Even though drastic and permanent changes involve the coronary arteries, special care during the acute stages can prevent significant damage to the heart muscle. Such special care is continued until nature has enlarged the intercoronary anastomoses[5, 6, 7] to the degree that coronary flow is adequate to meet the demands of the myocardium under stress. The importance of an early diagnosis is, therefore, emphasized.

The recent painstaking investigations in electrocardiography of Wilson, Nyboer, Master and Levy and their associates have added much to the clinical information afforded by the electrocardiogram. It is with the combined application of their contributions that this paper is concerned.

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The electrocardiographic studies to be described may appear cumbersome but repeated use of these procedures has resulted in a practical routine. However, it should be added that in many instances any demonstration of a reduced coronary reserve is important enough to justify unusual effort.

The following routine has been found useful in this laboratory:

1. a. Conventional electrocardiogram with two chest leads.
   b. Orthodiascopy and cardiac fluoroscopy.
2. Unipolar precordial electrocardiogram.
3. Unipolar esophageal electrocardiogram.
4. Master "2-Step" Exercise Test.
5. Levy Anoxemia Test.

Usually each succeeding step is taken only when the preceding one proves non-revealing. The individual clinical picture generally dictates the selection of the tests.

The recommendations of the committee of the American Heart Association on the standardization of electrocardiographic nomenclature[8] are followed in this paper. Further recommendations of Wilson[9] are used in the additional terminology. All electrocardiograms are taken with the patient in the recumbent position.[10]

CONVENTIONAL ELECTROCARDIOGRAM, ORTHODIASCOPY AND CARDIAC FLUOROSCOPY

The conventional electrocardiogram consists of the classical bipolar limb leads and two bipolar precordial leads between the chest (C) and the left leg (F): CF_2 located over the right ventricle and CF_4 over the left ventricle. These two precordial leads produce tracings that are the resultants of potential variations of the electrical field from a relatively small area of the anterior myocardium and the electrical field from the diaphragmatic surface of the heart. The distribution of the latter electrical field within the body varies greatly secondary to the numerous intrathoracic positions the heart may assume. In accordance with laws governing the action currents of the heart within the body,[11] the magni-

tude of the potential variations of these currents diminishes as the distance from the heart increases. Therefore, it is apparent that the resultant bipolar precordial electrocardiogram is predominantly determined by the electrical field from a small area of the anterior heart surface, picked up by the "exploring" electrode, and to a definite but lesser degree by the electrical field of the inferior heart surface, via the "indifferent" leg electrode[12, 13, 14, 15] (see Fig 1). The varying influence of the indifferent left leg electrode makes difficult a logical interpretation of the bipolar method and defeats partially the purpose of the precordial electrocardiogram.

The present widespread use of the bipolar precordial electrocardiogram may well result in the erroneous interpretation of tracings from normal in-

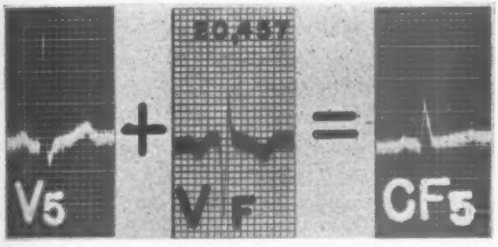

Fig. 1.—Algebraic equation illustrating the influence of the left leg lead, V_F, (shown as the mirror image of the unipolar left leg electrocardiogram) on the bipolar precordial electrocardiogram, CF_5. V_5 is the unipolar precordial electrocardiogram representing the electrical potential of a relatively small area of the left ventricle in pure form.

dividuals, particularly when there is a question of coronary artery disease. Such errors may be due in part to the difficulties described in the preceding paragraph. Also, recent textbooks on clinical electrocardiography, setting up normal criteria for these precordial tracings, do not consider the varying influence of the indifferent left leg electrode and rarely adequately emphasize the wide range of normal variation.

The two bipolar precordial leads are still used routinely in this laboratory rather than the preferable unipolar leads, to be discussed later, owing to the fact that they are more easily obtained by the technician. However, they are interpreted with many reservations.

The term, "Lead IV", has been avoided in this discussion because it is misleading. The precordial leads are semi-direct leads from the anterior heart surface and are fundamentally different from the classical limb leads. The electrocardiograms of the latter are the resultants of the electrical fields from two large areas of the myocardium obtained from points at relatively great and equal distances from the heart.

Orthodiascopy, after Kurtz,[16] has proven a simple and satisfactory means of detecting cardiac enlargement, which may be regarded as a sign of heart disease, often of long duration. Knowledge of the heart's size, shape and position is of invaluable aid in the clinical interpretation of the electrocardiogram.[9, 17, 18] Cardiac and pulmonary fluoroscopy add still further information.

UNIPOLAR PRECORDIAL ELECTROCARDIOGRAM

The precordial leads are taken from positions on the chest designated 1, 2, 3, 4, 5 and 6 extending from right to left, over the right and left precordium, defined by the committee of the American Heart Association for the standardization of precordial leads.[19, 20]

Additional leads are taken from the left posterior axillary line designated as 7, the left scapular line, designated as B, both at the same level as position 6 and another from the tip of the ensiform process, designated as E (see Fig. 2). The letter V indicates the unipolar lead while CF indicates the bipolar lead with the left leg as the site of the indifferent electrode.[19]

The unipolar precordial electrocardiogram is obtained by placing the exploring electrode on the various chest sites, while the indifferent lead is attached to a "central terminal" of approximately zero potential. In this laboratory a central terminal recommended by Wilson[9] is used which consists of three wires connecting the three extremities, right and left arms and the left leg (see Fig. 3). The use of this central terminal as the indifferent electrode allows the potential variations over the precordium to be recorded in pure form.[21, 22]

In the normal unipolar precordial electrocardiogram from the right precordium, i.e., V_1 and V_2, the R deflections are small and thin while the S deflections are relatively deep and thick. As tracings are obtained from points further to the left, the R deflections progressively become larger, until position V_5 is reached, while the S deflections become smaller and thinner and a Q wave may appear. At and beyond V_5 the R deflections become progressively smaller. In the adult the T wave is upright except at V_1 where it may be either upright or inverted.[15]

The R deflection reflects the "electrical force produced by excitation of the muscle between the exploring electrode and the ventricular cavity."[9] The T wave is thought to be due to a reversal or decline of the excitation process.[23] Abnormal alterations in the form of the electrocardiogram reflect a change in the normal physiochemical processes of the myocardium accompanying such conditions as anoxia, tissue inflammation, tissue necrosis, tissue fibrosis, alteration in acid base balance, and many others.

Augmented unipolar limb leads, allowing the recording of the cardiac potential variations from one extremity, are obtained by breaking the connections

the detection of small lesions involving the anterior, lateral and diaphragmatic (anterior portion) surfaces of the heart that may not be evident in the conventional mode. This type of electrocardiogram lends itself to a logical interpretation because it reflects only the potential variations of the underlying myocardium, unaffected significantly by the indifferent electrode or the position of the heart. This method is not disposed to the difficulties and errors of interpretation present in the bipolar method.

It is easily appreciated that the unipolar techniques and studies of Wilson have established clinical electrocardiography on a more scientific basis,

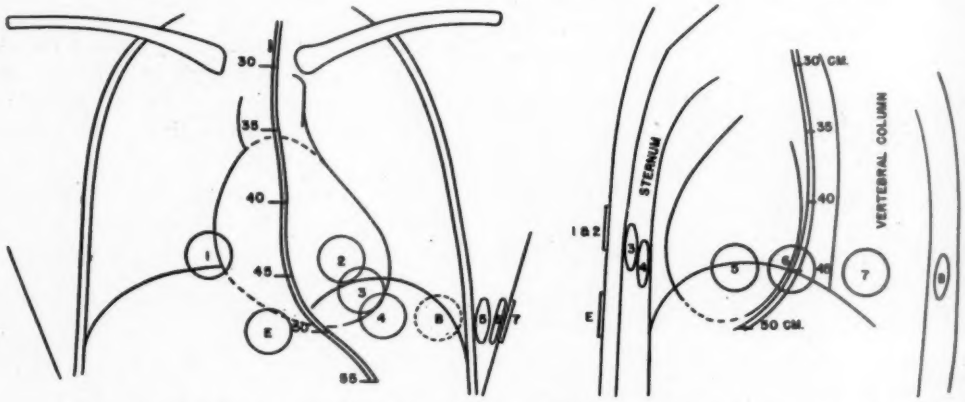

Fig. 2.—Orthodiagram of a normal individual. (A). Antero-posterior view. (B) Left lateral view. Coins were placed on the various chest sites and a metallic electrode at various esophageal levels to demonstrate the relation of these positions to the heart. E over the tip of the ensiform process; 1 and 2 in the right and left sternal lines at the level of the fourth interspace; 4 in the left mid-clavicular line at the level of the fifth interspace; 3 midway between 3 and 4; 5, 6 and 7 in the left anterior, mid and posterior axillary lines and B in the left scapular line. The last four positions at the same level as 4. The centimeter markings indicate the distance of various esophageal levels from the external nares.

of one extremity with the central terminal and attaching the exploring lead wire to the electrode of that extremity[9] (see Fig. 3). For practical purposes these augmented unipolar limb leads serve as unipolar leads. At the present time, a sufficient number of statistical studies using this technique has not been published to justify the clinical use of augmented unipolar limb electrocardiograms other than to determine the electrocardiographic position of the heart.

The combined interpretation of the nine unipolar chest and the three unipolar limb electrocardiograms affords the same information as precordial tracings, many times in excess of this number, obtained by using the limbs and back individually as the site of the indifferent electrode.

The unipolar precordial electrocardiogram allows

allowing logical interpretation in place of the less satisfactory empirical interpretation necessitated by bipolar techniques.

For a complete discussion of this subject the reader is referred to "The Unipolar Electrocardiogram", a monograph by Wilson,[9] undoubtedly a classic.

UNIPOLAR ESOPHAGEAL ELECTROCARDIOGRAM

The esophageal electrocardiogram is obtained by placing an exploring electrode* at various esophageal levels in close proximity to the posterior surface of the heart. This arrangement consists of a Rehfuss type stomach tube through which a wire is connected to a small metal tip on the distal end. This wired tube is passed through the nose in the usual manner. High resistances encountered with the eso-

*The Nyboer esophageal lead may be obtained from C. R. Bard, Inc., 79 Madison Avenue, New York.

phageal electrode necessitate the use of an amplifying tube electrocardiograph.

The central terminal of zero potential, previously described, is used as the indifferent electrode in obtaining unipolar esophageal electrocardiogram, thus the potential variations of the posterior myocardium are recorded in pure form. These tracings are designated by the letter E followed by a number indicating the distance of the exploring electrode in centimeters from the external nares.[9] Tracings are usually obtained at 2.5 centimeter intervals between 55 and 30 centimeters from the nose (see Fig. 2).

Esophageal electrocardiograms representing the potential variations of the posterior myocardium of both the normal and abnormal heart have been shown to correlate with established electrocardiographic principles,[24, 25, 26, 27] with certain exceptions. These exceptions are presumably due to artefacts resulting from synchronous motion of certain portions of the esophagus with cardiac movements.

The normal esophageal electrocardiogram (see Fig. 12) from ventricular levels is similar in form to the precordial electrocardiogram from sites opposite the antero-lateral aspects of the left ventricle, i.e., V_4 and V_5, and the unipolar limb electrocardiogram reflecting the potential variations of the left ventricle. Auricular levels yield tracings with a characteristic intrinsic auricular deflection (similar to the RS deflection of the ventricular complex) and a ventricular complex which changes in form as higher auricular levels are reached. The ventricular complex from low auricular levels resembles that from the ventricular level. As higher auricular levels are attained, the R deflection becomes smaller and the S deflection deeper until the ventricular complex is similar to that of the unipolar right arm lead. Above the auricular level both the auricular and ventricular complexes resemble those of the right arm, predominantly reflecting the negativity of the cardiac blood cavities throughout systole.

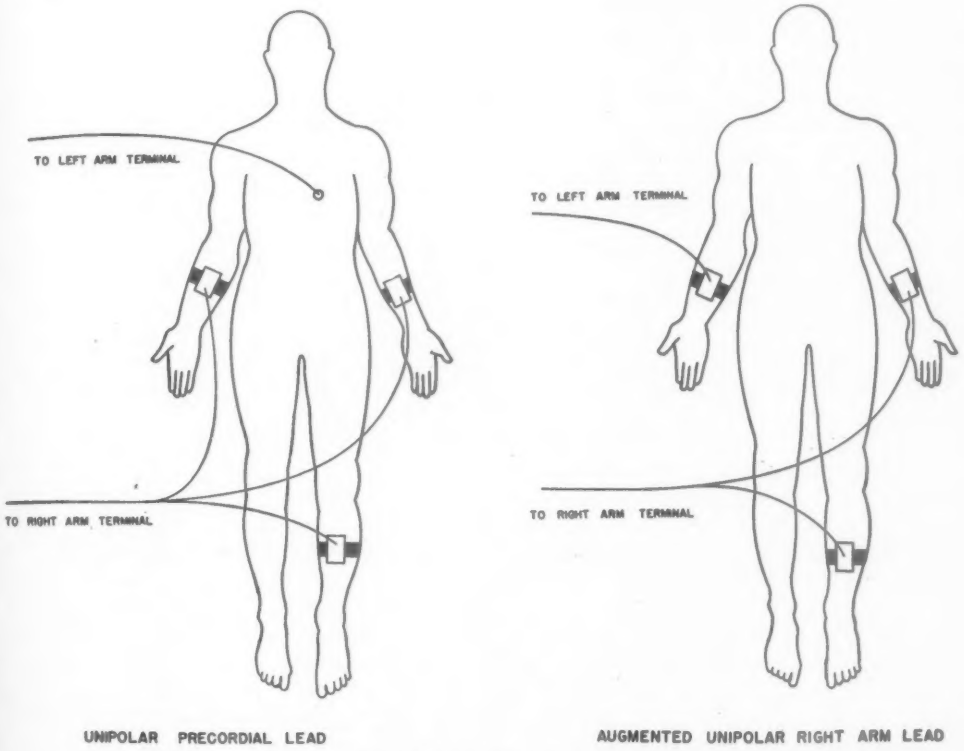
TO LEFT ARM TERMINAL
TO RIGHT ARM TERMINAL
UNIPOLAR PRECORDIAL LEAD
TO LEFT ARM TERMINAL
TO RIGHT ARM TERMINAL
AUGMENTED UNIPOLAR RIGHT ARM LEAD

Fig. 3.—Diagram of central terminal and method for obtaining unipolar precordial and augmented unipolar limb electrocardiograms as recommended by Wilson[9]. The unipolar limb leads are designated: right arm V_R, left arm V_L and left leg V_F.

MASTER: "TWO-STEP" TEST

MALES

Table I.

STANDARD NUMBER OF ASCENTS

WEIGHT	Age 5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
40-49	35	36											
50-59	33	35	32										
60-69	31	33	31										
70-79	28	32	30										
80-89	26	30	29	29	29	28	27	27	26	25	25	24	23
90-99	24	29	28	28	28	27	27	26	25	25	24	23	22
100-109	22	27	27	28	28	27	26	25	25	24	23	22	22
110-119	20	26	26	27	27	26	25	25	24	23	23	22	21
120-129	18	24	25	26	27	26	25	24	23	23	22	21	20
130-139	16	23	24	25	26	25	24	23	23	22	21	20	20
140-149		21	23	24	25	24	24	23	22	21	20	20	19
150-159		20	22	24	25	24	23	22	21	20	20	19	18
160-169		18	21	23	24	23	22	22	21	20	19	18	18
170-179			20	22	23	23	22	21	20	19	18	18	17
180-189			19	21	23	22	21	20	19	19	18	17	16
190-199			18	20	22	21	21	20	19	18	17	16	15
200-209				19	21	21	20	19	18	17	16	16	15
210-219				18	21	20	19	18	17	17	16	15	14
220-229				17	20	20	19	18	17	16	15	14	13

FEMALES

Table II.

WEIGHT	Age 5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
40-49	35	35	33										
50-59	33	33	32										
60-69	31	32	30										
70-79	28	30	29										
80-89	26	28	28	28	28	27	26	24	23	22	21	21	20
90-99	24	27	26	27	26	25	24	23	22	22	21	20	19
100-109	22	25	25	26	26	25	24	23	22	21	20	19	18
110-119	20	23	23	25	25	24	23	22	21	20	19	18	18
120-129	18	22	22	24	24	23	22	21	20	19	19	18	17
130-139	16	20	20	23	23	22	21	20	19	19	18	17	16
140-149		18	19	22	22	21	20	19	19	18	17	16	16
150-159		17	17	21	20	20	19	19	18	17	16	16	15
160-169		15	16	20	19	19	18	18	17	16	16	15	14
170-179		13	14	19	18	18	17	17	16	16	15	14	13
180-189			13	18	17	17	17	16	16	15	14	14	13
190-199			12	17	16	16	16	15	15	14	13	13	12
200-209				16	15	15	15	14	14	13	13	12	11
210-219				15	14	14	14	13	13	13	12	11	11
220-229				14	13	13	13	13	12	12	11	11	10

From Master *et al.*, *Am. Heart J.* **24**:777, 1942, by permission of Commander A. M. Master and the C. V. Mosby Co., St. Louis.

The esophageal electrocardiogram is similar to the precordial electrocardiogram in that it records the potential variations of relatively small areas of the myocardium and thus allows the detection of small lesions otherwise not evident in the usual electrocardiogram.

MASTER "2-STEP" TEST

This is a functional test of the heart, rigidly standardized by many trials and years of observation, which is safe and convenient to perform.[28, 29] Although this procedure was formerly used as a test of the mechanical efficiency of the cardiovascular system, it has recently been adapted for an electrocardiographic investigation of coronary insufficiency,[30, 31, 32] wherein certain changes in the form of the electrocardiogram, following exercise, have been defined as consistent with that condition.

These electrocardiographic changes are due to alterations of physiochemical processes in the myocardium, presumably due to ischemia resulting from a discrepancy between the coronary flow and the metabolic demands of the heart.

The test with minor technical modifications as used in this laboratory is as follows: After the patient has reclined for sufficient time to allow the cardiovascular system to assume a basal level, a control electrocardiogram is recorded. The control consists of leads I, II, III and CF_4 (the precordial electrode held in place by a rubber chest strap). A standardized amount of exercise is then performed by the patient in a definite time interval. This amount is governed by tables (see Tables I and II) compiled, according to sex, age and weight, from careful quantitative measurements of work[28] which does not produce an "abnormal response" in the normal individual.[30, 31, 32, 33] The patient then walks up and down two nine-inch steps, one "trip", a certain number of times in exactly one and a half minutes. This is accurately accomplished when the patient is so instructed that one "trip" requires exactly five paces (see Fig. 4) and each pace is taken synchronously with the beat of a metronome. The metronome rate which will allow the completion of the exercise in the exact time specified is obtained by multiplying the prescribed number of "trips" by the arbitrary factor 3.33. At the end of each "trip" the patient turns in the same direction, avoiding dizziness and entanglement in the electrocardiographic cable. Immediately after completion of the exercise he lies down again and another electrocardiogram is recorded. It is important that this second tracing be completed within one minute after exercise as abnormal electrocardiographic responses are often very transient. Greater accuracy in the standardization of the record is obtained by using two millivolts for a two centimeter deflection rather than the usual one millivolt for one centimeter.

When the standard test does not produce an abnormal response the procedure is repeated, after a suitable rest period, with twice the number of "trips" at the same rate. In the event that precordial discomfort appears during exercise, the completion of the prescribed number of "trips" is not attempted and the second electrocardiogram is recorded.

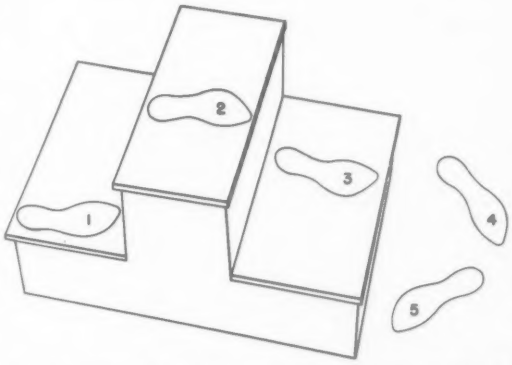

Fig. 4.—Master "2-Step", two nine inch steps. The foot-prints illustrate how one "trip" can be performed in exactly five paces.

The criteria of an abnormal response are: (1) Depression of the RS-T segment of more than 0.5 mm. below the P-R interval level. (2) A change in the T-wave from upright to isoelectric or inverted form, or from inverted to isoelectric or upright form. (3) Multiple premature beats. (4) Widening of the QRS. (5) Deep Q waves. (6) Prolongation of the P-R interval. (7) Heart block.[32]

Extracardiac factors capable of influencing the electrocardiogram that should be ruled out in the event of an abnormal response are: pulmonary disease, anemia, fever, hyperthyroidism, tachycardia, upper respiratory infections, a recent meal, smoking, drugs affecting the cardiovascular system, etc. Factors such as the state of the individual's physical training or occupation have no significant influence

in the electrocardiographic response to this standardized exercise.[29, 31, 33]

In some instances, many times the amount of the standardized exercise may be performed by the normal individual without an abnormal electrocardiographic response, although blood pressure and pulse rate changes fall within the realm of the abnormal.[34] This probably suggests that in the normal individual there is little correlation between the form of the electrocardiogram and the mechanical efficiency of the cardiovascular system in response to exercise.

According to the studies of Master *et al*,[32] in patients with "angina pectoris" this test provides objective evidence of "coronary insufficiency" in 39 per cent of those with normal and in 66 per cent of those with abnormal control electrocardiograms. The precipitation of precordial and associated discomfort is regarded as presumptive evidence; however, no correlation appears to exist between the presence or absence of subjective sensations and the electrocardiographic response in these patients.

In addition to the objective and presumptive evidence offered by this test, observation of other general physical and psychic responses, before, during and after exercise is of further aid in evaluating the individual's clinical picture.

Thus, the Master Test in a certain percentage of patients with angina of effort gives objective electrocardiographic evidence of heart disease when such is not evident in the previously described techniques because of type, degree or location of the lesion.[34]

Some investigators[35] do not agree with Master as to the diagnostic value of exercise tests. It is difficult to compare and evaluate studies carried out under dissimilar conditions; however, none of these has approached Master's rigid standardization. Still others recognize the value of exercise tests but disagree as to the criteria of an abnormal response.[36, 37, 38, 39]

LEVY ANOXEMIA TEST

This is also a functional test of the heart, standardized by many trials on several hundred individuals[40, 41, 42, 43, 44, 45, 46, 47] and it is easily performed under conditions that allow a maximal control of extracardiac factors. Certain changes in the form of the electrocardiogram resulting during induced anoxemia serve as an index, within undefined limits, of coronary reserve.

The coronary flow in the normal individual is adequate to supply the myocardium with sufficient oxygen to maintain the normal spread and retreat of the excitation wave during the myocardial anoxia produced by this test. Individuals with coronary artery disease, where the flow is adequate to meet the metabolic demands of the myocardium under basal conditions, may develop cardiac pain and electrocardiographic changes during induced anoxemia. This test, in contrast to exercise, theoretically reduces only the oxygen content of the blood without altering the coronary flow or appreciably increasing the work of the heart.

In this procedure the patient lies on a comfortable table and breathes through a mouthpiece into the Levy apparatus.* Room air, 100 per cent oxygen, or a mixture of 10 per cent oxygen and 90 per cent nitrogen, may be administered by adjusting a set of valves. After breathing room air through the apparatus for a sufficient time to allow the cardiovascular system to assume a basal status, a control electrocardiogram consisting of leads I, II, III, and CF_4 is recorded. The patient is then allowed to breathe a mixture of 10 per cent oxygen and 90 per cent nitrogen, which at sea level produces a similar degree of blood oxygen saturation normally experienced at about an 18,000 foot altitude.[47] The patient breathes this gas mixture for twenty minutes or less if anginal pain occurs when a second electrocardiogram is recorded. After the second tracing is obtained 100 per cent oxygen is administered for one minute.

The criteria for an abnormal response are: (1) The arithmetical sum of the RS-T deviation in all four leads should total 3 mm. or more. (2) Partial or complete reversal of the direction of the T wave occurs in Lead I, accompanied by an RS-T deviation of 1 mm. or more in this lead. (3) A complete reversal of the direction of the T wave occurs in CF_4, regardless of any associated RS-T deviation in this lead.[48]

Extracardiac factors to be considered in case of an abnormal response with the Levy Test are the same as those for the Master Test. Specific contraindications to the Levy Test are: the presence of congestive heart failure, performance of the test within four months of known myocardial infarction, or more than one test in twenty-four hours.[48] When

*Apparatus may be secured from the Foregger Co., 55 W. 42nd Street, New York, and the gas mixture from the Puritan Compressed Gas Co., Baltimore, Md.

these rules are observed the test is considered safe.

Results obtained with this gas mixture at different altitudes cannot be compared for, although the volumetric ratio of the inhaled gases remains constant, variations in atmospheric pressure directly effect the concentration of oxygen delivered to the lungs per unit volume of gas. Caution should therefore be observed at localities of significant altitude as the degree of blood oxygen saturation allowed by this mixture at or near sea level probably represents the maximum degree of temporary anoxemia consistent with safety.

According to studies by Levy *et al*,[44] in patients presenting "coronary sclerosis with pain", this test provides objective evidence of "coronary insufficiency" in 38 per cent of those with normal and in 62 per cent of those with abnormal control electrocardiograms. Again no particular correlation appears to exist between the occurrence of pain and the electrocardiographic response.

CASES

The following case reports are presented to illustrate specific instances wherein the preceding electrocardiographic techniques were the only means of obtaining objective evidence consistent with coronary artery and heart disease. The first two cases probably represent individuals in whom coronary artery disease is well established; nevertheless, objective evidence of this condition in these two relatively young men allowed the diagnosis and subsequent management to be instituted with more confidence than would have been possible had such evidence been lacking. In the third case, the opinion of the examiners was formed prior to the special electrocardiographic studies. This opinion was further strengthened by the negative findings in these studies.

Case 1.—Mr. G. L. P., a white farmer, aged 38 years, was admitted to the University Hospital on October 25, 1943. His chief complaint was a "numb aching" precordial discomfort that usually followed large meals, excitement and varying degrees of exercise. This complaint was of two years' duration. At times there was an associated discomfort which radiated down the inner side of the left arm to the fingers, a choking sensation and an aching of the jaw and lower teeth. In the two months prior to admission this condition became so severe as to prevent the patient from working at his accustomed rate. In this latter period seizures subsequent to the initial daily attack were caused by increasingly greater effort. Relief was obtained by rest.

The review of systems was negative except for occasional nocturia of years' duration. The patient was in the habit of smoking a half pack of cigarettes a day. The past history was negative.

Physical examination revealed a robust young white male with no definite abnormalities. The systolic blood pressure was 122 mm. of Hg; the diastolic 80 mm. of Hg. The eye grounds were normal. The Wassermann and Kahn tests were negative. The routine blood studies, urinalysis, stool examination, erythrocyte sedimentation rate and x-ray examinations of the heart aorta and gastrointestinal tract disclosed no abnormalities. Orthodiascopy (see Fig. 5) revealed a measured frontal plane of 119 sq. cm.

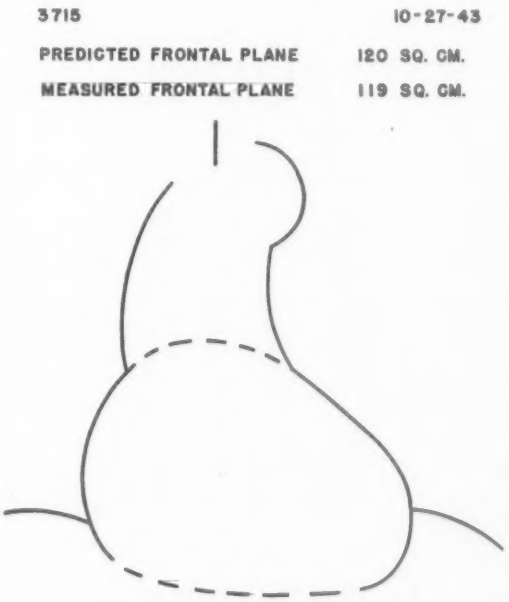

Fig. 5.—Normal orthodiagram of Case 1.

and a predicted frontal plane of 120 sq. cm. X-ray studies of the dorsal spine showed moderate compression of the bodies of the seventh, eighth and ninth dorsal vertebrae with new bone formation between these bodies. An Exton-Rose glucose tolerance test yielded these figures: fasting blood sugar of 82 mgm. per cent, after 30 minutes 102 mgm. per cent, and 177 mgm. per cent after 60 minutes. A routine electrocardiogram was within the limits of normal variation.

Tracings obtained on October 30, 1943 (identical with those of Fig. 6) showed an inverted T wave in lead III. The unipolar chest electrocardiogram was within the limits of normal; however, the unipolar esophageal electrocardiogram demonstrated diphasic (∓)T waves at ventricular levels, 55, 52.5 and 47.5 cm. The T wave suggested the presence of damage of the posterior wall of the left ventricle.

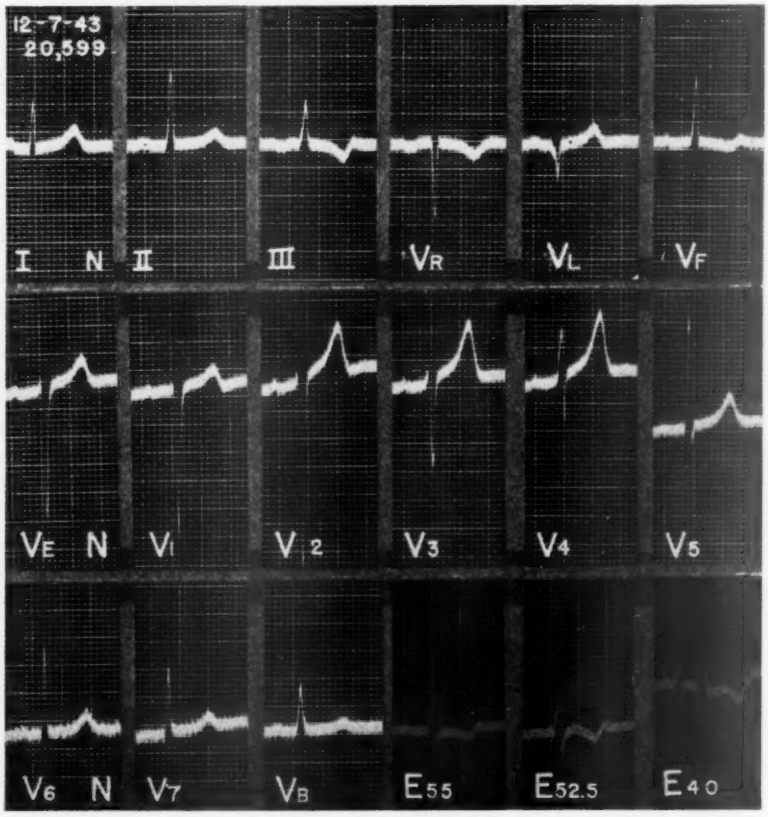

Fig. 6.—*Case 1* (J.L.P.). A 38 year old farmer suffering from angina pectoris. Classical bipolar limb and unipolar precordial electrocardiogram within normal limits. Abnormal diphasic (∓) T waves in unipolar esophageal electrocardiogram from ventricular levels 55 and 52.5. E 40 is characteristic of the normal esophageal electrocardiogram from the auricular level. Absent R in the unipolar left arm trace, V_L, and diphasic (∓) T in the unipolar left foot trace, V_F, the latter resembling the T of the ventricular esophageal electrocardiogram.

It is interesting to observe that the unipolar left arm lead, V_L contains a relatively large (6 mm.) QS deflection while the T wave of the unipolar left leg lead, V_F, resembles the diphasic T of the ventricular esophageal electrocardiogram. This raises the question as to whether, in this particular case, the combination of electrical potentials from two large areas of the heart's surface, represented in the classical limb electrocardiograms, obscures information otherwise evident in the unipolar limb electrocardiogram. The answer to such a question must await further study not available at present in the literature.

On October 30, 1943, the double standard Master "2-Step" Test, consisting of 42 "trips" in three minutes was performed. Figure 7 showing tracings of an additional test performed on December 7, 1943, reveals the following changes in the electrocardiogram after exercise: RS-T depression of 1+ mm. in lead I, 2+ mm. in lead II, 1 mm. in III and 1.5 mm. in lead CF_4; T_3 and P_3 from inverted to upright positions and a reduction of the T wave in CF_4 from 7 mm. to 3.5 mm. These changes constitute an abnormal response consistent with coronary

insufficiency. The exercise was accomplished without causing precordial discomfort but with a degree of dyspnea not usually seen in the normal individual.

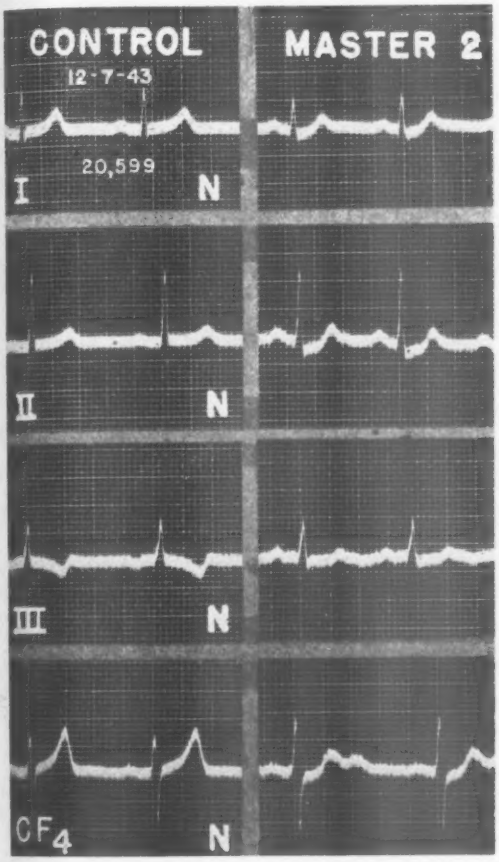

Fig. 7.—*Case 1.* Control electrocardiogram normal. After the double standard Master "2-Step" Test (42 "trips" in 3 minutes) there was a depression of RS-T segments in all leads with Ts becoming upright.

Tracings taken immediately before and after smoking two cigarettes showed similar electrocardiographic changes but of lesser degree than those produced by the Master exercise test. Smoking, however, caused an increase in the heart rate of greater duration than this amount of exercise.

The Levy Anoxemia Test (old method with 12 per cent oxygen and 88 per cent nitrogen[41]) produced no discomfort or significant electrocardiographic changes.

In spite of management consisting of restriction of activities and vasodilator drugs the patient's condition progressed unfavorably. On December 10, a laminectomy was performed and the posterior roots of the first four thoracic nerves were sectioned bilaterally. Following the operation, the patient experienced no further precordial or right arm pain; however, exertion continued to reproduce the "choking" sensation. Seven weeks later he was able to perform the majority of his former activities with little discomfort and at that time spontaneously expressed pleasure concerning the result accomplished by the operation.

Electrocardiographic studies on February 1, 1944, revealed that the QS deflection in the unipolar left arm electrocardiogram had been replaced by a 4 mm. R wave while the diphasic T wave in the unipolar left leg electrocardiogram had become deeply inverted. There were no other definite electrocardiographic changes. A double standard Master "2-Step" Test showed a response similar to previous tests.

Case 2.—Mr. X. X., a gentleman-farmer, aged 38 years, was referred to this laboratory for studies on November 14, 1943. Four days previously while marching in an Armistice Day parade the patient was beset with a severe substernal "pressure" pain

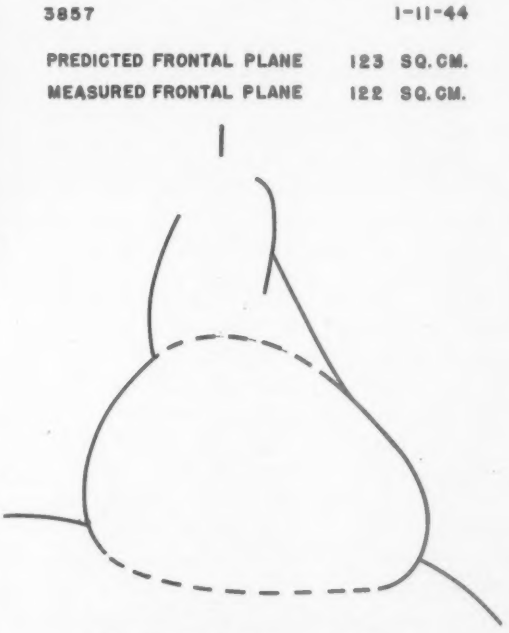

Fig. 8.—Normal orthodiagram of *Case 2.*

that forced him to stop and rest. In the next few days he found that he could walk only a few blocks on level ground before experiencing a similar pain accompanied by moderate dyspnea. The review of systems and past history was negative. The patient habitually smoked about ten cigarettes a day.

Physical examination found the patient well developed but somewhat overweight. The systolic blood pressure was 150 mm. of Hg; the diastolic, 104 mm. Hg. The eye grounds showed no abnormal vascular

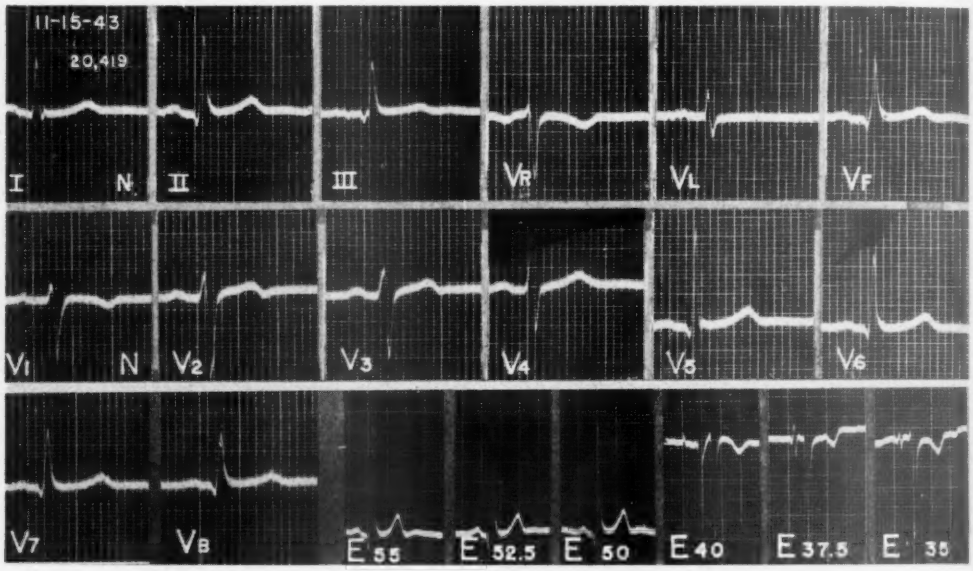

Fig. 9.—*Case 2* (X.X.). A 38-year old gentleman farmer with angina pectoris. Classical bipolar limb, unipolar limb, chest and esophageal electrocardiogram within limits of normal variation. Trace taken with paper speed of 50 mm. second.

changes. The Wassermann and Kahn tests were negative. Routine blood studies were normal. Blood sedimentation (Mod. Cutler) was 15 mm. in one hour. Orthodiascopy revealed a measured frontal plane of 122 sq. cm. and a predicted frontal plane of 123 sq. cm. (see Fig. 3). A routine electrocardiogram was within the limits of normal variation.

Additional electrocardiograms, including unipolar chest and esophageal tracings, were within the limits of normal (see Fig. 9). The double standard Master "2-Step" Test, consisting of 42 "trips" in three minutes, caused the following changes in the form of the electrocardiogram: RS-T depression of 2 mm. in lead I, 2+ mm. in lead II and 1.5 mm. in lead III; change in the form of the T wave in CF_4 from diphasic to upright and the appearance of multiple aberrant QRS complexes of ectopic ventricular origin. Similar changes of lesser degree were present after smoking two cigarettes with the exception of aberrant QRS complexes. A Levy Anoxemia Test was not performed.

Serial tracings taken at intervals of from one to four weeks demonstrated rather dramatic changes in the unipolar precordial electrocardiogram from positions 2, 3 and 4. Five sets of tracings, each taken at least two hours after eating, revealed the T waves from these positions to alternate regularly between the upright and inverted forms. The remaining unipolar chest leads and the classical limb leads showed no definite changes. However, on one of the occasions when the above-mentioned precordial T waves were inverted, the unipolar left arm electrocardiogram contained an inverted T wave. A marked sinus arrhythmia was present in each tracing and forced inspiration slowed the heart rate to fifty-three a minute, suggesting a strong vagal influence.

Further electrocardiographic studies gave no additional information. These consisted of numerous unipolar and bipolar chest electrocardiograms taken from sites other than those recommended by the American Heart Association committee and during various phases of forced respiration.

Weight loss by dieting, limitation of activities and the use of vasodilator drugs has apparently been beneficial to this patient, as he rarely experiences precordial discomfort which is less intense if it does occur.

This case illustrates an instance in which the

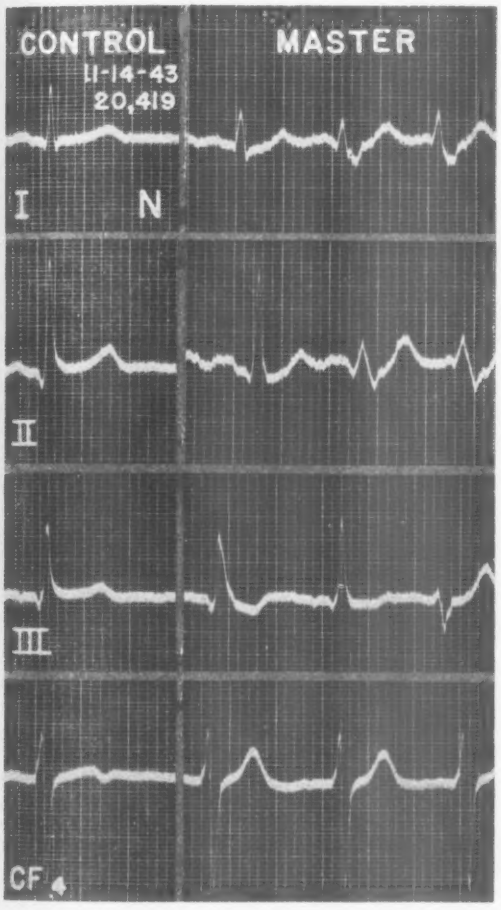

Fig 10.—*Case 2.* Normal control electrocardiog-am. After the double standard '2-Step" Test (42 "trips" in 3 minutes) there was a depression of all RS-T segments and the appearance of many aberrant KRS complexes of ectopic ventricular origin.

Master exercise test offered objective evidence consistent with coronary insufficiency before sufficient myocardial change had occurred to be evident in the electrocardiogram at rest.

Case 3.—Mr. H. F. N., an oil company agent, aged 44 years, was seen on November 11, 1943, having been referred to a member of the staff for an evaluation of his cardiac status. Three years previously this patient was beset with weakness and a tendency to fatigue precipitated by a few hours of desk work. In March, 1943, he had an attack of marked dyspnea and "palpitation" after walking up a flight of steps and, thereafter, he experienced many nocturnal episodes of "suffocation", relieved by "jumping" out of bed.

In May the patient became conscious of a substernal "pressure" pain associated with exertion and relieved by rest or nitroglycerine. The pain was limited to the sternal region and was not accompanied by shortness of breath. At that time, the patient consulted a heart specialist in an Eastern city who interpreted an electrocardiogram as showing "some evidence of coronary sclerosis". He was advised of his "condition" with instructions to "reduce his protein consumption", to "eat moderately of meat three times a week" and to "take fifteen grains of potassium iodide three times a day". However, no improvement was noted.

A review of systems revealed that the patient had a "constant aching pain" in the dorsal region since the onset of the present illness. He felt that this backache was not associated with the precordial discomfort. The past history indicated an attack of mumps in early life.

Physical examination showed a well developed and nourished middle-aged man who complained of numbness in the left arm when that limb was abducted. Bilateral atrophy of the testes was the only other abnormality found. The systolic blood pressure was 125 mm. of Hg; diastolic, 90 mm. Hg. The eye grounds and peripheral vessels revealed no abnormalities. The Wassermann and Kahn tests were negative. Urinalysis and routine blood studies were normal. X-ray studies showed minor hypertrophic changes of the dorsal spine and a calcium deposit in the mediastinum. Orthodiascopy demonstrated a measured frontal plane of 101 sq. cm. to a predicted plane of 102 sq. cm. (see Fig. 11). A routine electrocardiogram was within the limits of normal variation.

A diagnosis of cardiac neurosis was made which was based on the above findings and an evaluation of the patient's personality.

Further electrocardiographic studies consisting of unipolar chest, limb and esophageal tracings (see

Fig. 12), a double standard Master "2-Step" Test, requiring forty-four "trips" in three minutes, and the

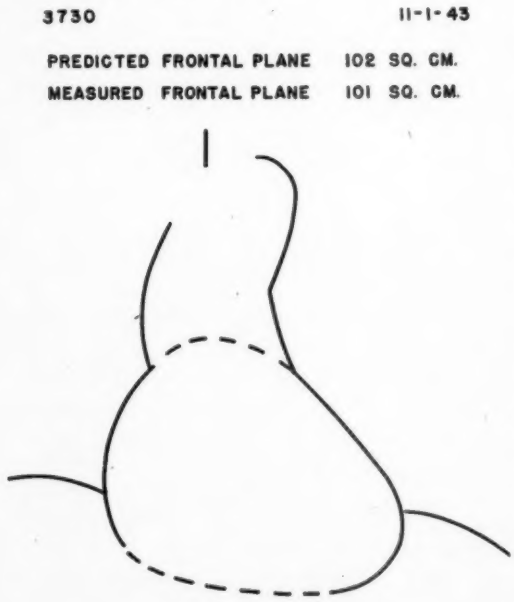

Fig. 11.—Normal orthodiagram of *Case 3.*

DISCUSSION AND SUMMARY

The foregoing discussion, technical as it may seem, is not intended to cloud the issue but rather to clarify certain new fields in electrocardiography. Further, it is obvious that the electrocardiogram, at best, is only a laboratory procedure and that one good history is vastly more important in many instances than a series of electrocardiographic tracings. Clinical decisions should be heavily weighted in favor of the history. However, added objective evidence of the type described here often helps the physician to arrive at a more accurate conclusion in certain obscure cases.

The special electrocardiographic tests, herein described, have not been emphasized because it is believed that they will necessarily supplant conventional forms of electrocardiography but rather because they add to and supplement the more usual electrocardiographic methods. Often, as demonstrated in Case 1, the classical bi-polar limb electrocardiograms fail to yield the desired information. Obviously the question here was one of paroxysmal heart pain versus referred pain from an old lesion of the spine. Relief could not possibly result from an operation designed to relieve heart pain if the

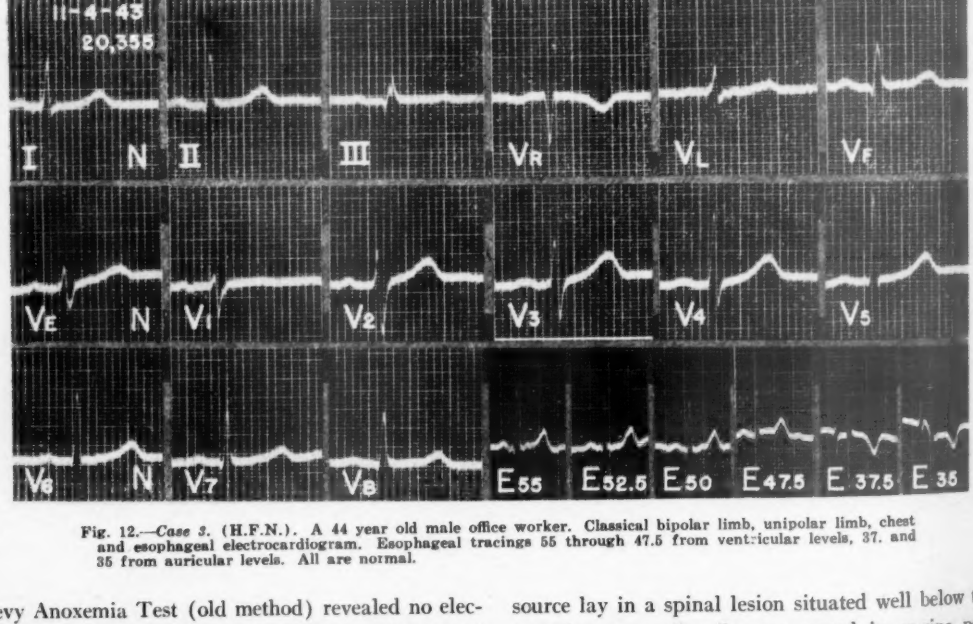

Fig. 12.—*Case 3.* (H.F.N.). A 44 year old male office worker. Classical bipolar limb, unipolar limb, chest and esophageal electrocardiogram. Esophageal tracings 55 through 47.5 from ventricular levels, 37. and 35 from auricular levels. All are normal.

Levy Anoxemia Test (old method) revealed no electrocardiographic abnormalities. Also exercise caused no discomfort or significant shortness of breath.

source lay in a spinal lesion situated well below the somatic area ordinarily represented in angina pectoris. Therefore, an accurate decision was impera-

tive. The esophageal electrocardiogram and the Master Step Test proved the key to an obscure problem, the operation was done, and the patient largely relieved of his anginal syndrome.

Incidentally in this patient the unipolar limb electrocardiogram suggested abnormalities of the myocardium not evident in the classical bipolar limb electrocardiogram.

Again, in Case 2, the patient could not possibly believe that he had developed heart disease. He felt that good health was his forever and the necessity for curtailing his activity could not be adequately impressed upon him until he was confronted with objective evidence. It goes without saying that the physicians in this particular case felt more confident when the objective evidence was forthcoming.

A sharp contrast to the previous reports is noted in Case 3. The patient had been told that he had heart disease, had fixed the idea in his mind, and needed a series of strenuous and convincing studies, in addition to psychotherapy. Further, the physician who saw the case last, in this particular instance, was in a difficult position as he had to disprove a previous diagnosis. Let it be emphatically stated that electrocardiographic studies were not considered as unequivocal but they were at least thorough, and the final decision against heart disease was strengthened thereby.

The advantages of chest leads have been roundly discussed in the past ten years and it is believed that the advent of the unipolar lead will, definitely, increase the accuracy of this type of study. Add to this the fact that the esophageal lead enables the clinician to study that portion of the heart heretofore unavailable for semi-direct electrocardiographic studies and the diagnostic value of the electrocardiogram becomes further enhanced. In a recent study of a patient, the first objective evidence of heart disease was obtained from an esophageal lead. This proved to be of great value as the history had been extremely confusing. Finally, with the additional information supplied by the esophageal lead, a correct diagnosis was made and subsequent events largely anticipated.

In view of this and many other similar incidences, it appears that the adoption of these newer techniques in certain obscure cases will lead to the avoidance of many unpleasant surprises. It is not contended that a cumbersome and detailed routine should be used in every case. Often the history alone is enough to assure the clinician that no such detailed study is necessary. On the other hand, many of us have looked forward to the day when some objective study could be made in obscure problems involving the anginal syndrome. Whereas the millennium has certainly not arrived in this particular field, it does appear that the procedures outlined above have made a step forward. This summary of the newer electrocardiographic techniques has, therefore, been submitted, illustrated by three case reports in the hope that this description may save others time and trouble. The Master Step Test, especially, should be available to anyone who is a student of electrocardiography. It appears to be of much practical value. Again, it is important to note that it is not 100 per cent effective in picking out patients with the anginal syndrome. In fact, it may fail even when other evidence points almost unequivocally to this diagnosis. On the other hand, a positive test does suggest a significantly diminished coronary blood flow.

Physicians who are fortunate enough to have the Levy apparatus can combine a series of studies, including the Master Exercise Test and the Levy Anoxemia Test, and will obtain a higher percentage of objective positives in a series of suspected anginal cases.

The Master Step Test and the Levy Anoxemia Test are both standardized functional tests of the coronary reserve, within limits as yet undefined, that give objective evidence consistent with a diminished coronary flow in a significant portion of patients with angina pectoris. These procedures are also applicable to patients with coronary insufficiency without angina of effort. For reasons that are not understood, many instances arise wherein induced anoxemia may cause an abnormal electrocardiographic response while that following exercise is negative and vice versa.[34, 39, 49] Thus, as noted above, when both procedures are available, the chance of obtaining objective evidence of coronary insufficiency is greater than with only one. Caution should be observed in the application and interpretation of these two functional tests as injudicious use or the expectation of unreasonable dividends may cause them to fall into disrepute.

It is to be emphasized that a negative finding in any or all of these procedures by no means rules

out the presence of either coronary artery disease or other forms of heart disease. The electrocardiogram is the electrical reflection of physio-chemical processes in the myocardium alone and, with the exception of the cardiac arrhythmias, is a non-specific diagnostic procedure. Innumerable intrinsic and extrinsic cardiac factors[50,51] are capable of influencing the form of the electrocardiogram and only when an almost perfect correlation exists between the form of the electrocardiogram and other physiological and clinical conditions can the true significance of this procedure be evaluated. Certainly at this time, electrocardiography should be regarded as only another laboratory test.

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National Venereal Disease Control Conference.

A national venereal disease control conference will be conducted under the auspices of the United States Public Health Service at St. Louis, Missouri, November 9, 10 and 11. Leading experts on venereal disease control from the United States, and from some other nations, will consider international and post-war venereal disease control, and other specialized subjects such as new methods of treating the venereal diseases, diagnosis, epidemiology, education, and moral, social, and community influences. State and local health officers, venereal disease control officers, practicing physicians, and others engaged in venereal disease control activities are invited to attend. Meetings will convene in the St. Louis Medical Society Building at 3839 Lyndell Court.

The 1944 conference will be the third national venereal disease control conference. The first, conducted in 1936, in Washington, resulted in establishing the national venereal disease control program which has been expanded and continued to the present time. The second conference was conducted at Hot Springs, Arkansas, in 1942, to consider wartime venereal disease control.

HISTAMINIC CEPHALGIA WITH SPECIFIC THERAPY*

WM. H. HIGGINS, M.D.,
Richmond, Virginia.

In 1937 Horton first described at the Mayo Clinic a new syndrome of vascular headache known as Histaminic Cephalgia. His observations have established this specific type of headache as a distinct clinical entity, classical in its symptomatology and unique in its response to histamine therapy.

Histaminic Cephalgia is characterized by a unilateral headache which usually begins in the later decades of life, is of short duration as it generally lasts less than an hour and often terminates suddenly. It tends to awaken the patient at night and is frequently eased by assuming the sitting position or by standing erect. It is associated with profuse watering and congestion of the eye, unilateral sweating of the face, stuffiness of the nostril, increased surface temperature and often swelling of the temporal vessels of the involved side of the head.

Pain is the outstanding complaint. It is constant, boring and burning. The pain is not confined to the distribution of any cranial nerve but has a tendency to conform to the ramifications of the external carotid artery. In the first stages of the attack compression on the common carotid artery frequently gives relief. References have been noted regarding the relationship of the taking of alcohol to the production of the headache. On account of the frequency of these headaches at night many patients had slept propped up on pillows to allay the acuteness of the discomfort. Horton was able to induce these attacks of headache by the subcutaneous injection of .1 to 1.2 mgm. of histamine. Patients were unable to distinguish between induced and spontaneous attacks and it was never possible to create an attack of this character by giving histamine to a normal person.

In the treatment of this syndrome histamine diphosphate is the drug of choice. Desensitization is carried out by daily subcutaneous doses beginning with .25 c.c. and adding .05 c.c. each day for approximately twenty doses. Should any slight reaction, such as blushing, follow an injection, the next dose should be reduced 50 per cent. An effort is made to bring the resistance up to 1 c.c. without any subsequent reaction. A maintenance dose is given once or twice weekly until immunity is established. The spectacular manner in which patients respond indicates that histamine treatment is as specific for this syndrome as insulin is for the treatment of diabetes.

*Read before Richmond Academy of Medicine, April 25, 1944.

CASE REPORT

A white male, age 42, was first seen in October, 1941, with a chief complaint of headache. His previous history was entirely negative.

This patient stated that he had been subject to periodic attacks since 1925, and during this period had had extractions of teeth, removal of tonsils, drainage of maxillary sinus and section of nerve above his right eye without relief. These headaches were prone to come during the night, although at times they would develop during the day. The pain generally had its origin near the top of the head and then radiated down over the right temple and eye to the region of the right antrum. He described the pain as a burning, drawing sensation, and was associated with extreme lacrimation and perspiration over the right side of the face. During the attack he had spasm of the muscles around the right eye, as well as a blockage of the right nostril accompanied by a profuse aqueous discharge. He found that sitting up would tend to lessen the severity of the pain but leaning over intensified it. These attacks generally ceased after a period of two or three hours. During the three weeks prior to his examination the headaches, however, had been more or less continuous day and night with only short intervals of relief.

Physical Examination: This individual was a healthy looking man with no evidence of emotional imbalance or nervous tension. There was a scar over the right eye as a result of a nerve resection. Extrinsic and intrinsic muscles of the eyes were normal and there was no abnormal tension of the eye ball. All cranial nerves were normal. There was no nasal obstruction, throat was clean and all teeth had been removed. No adenopathy. Heart and lungs clear. Hgb. 100 per cent; RBC 4,440,000; WBC 6,600; Sed. Rate 9; Wassermann—negative; differential—negative; and urinalysis—negative.

A diagnosis of Horton's Histaminic Cephalgia was made which was confirmed by a typical reproduction of his symptoms following an injection of histamine. Desensitization was carried out over a period of several weeks, starting with injections twice daily and gradually increasing the amount and lengthening the interval between doses. On account of his sensitivity it was necessary to begin with 1-500 dilution. The relief from his headaches was prompt and, contrary to the majority of the cases reported, he has remained entirely well without maintenance doses. This patient was seen on April 19, 1944, at which time he reported that he had been entirely well since the treatments were discontinued.

Histaminic Cephalgia is a distinct clinical entity and, according to Horton,† over ninety per cent are successfully relieved by specific immunization.

†Horton, Bayard T.: *J.A.M.A.*, **116**; p. 377; February 1, 1941.

TUBERCULOSIS IN THE AGED*

C. L. HARRELL, M.D., F.A.C.P.,
Norfolk, Virginia.

For many years tuberculosis has been considered a disease of youth, affecting mainly those between fifteen and forty-five years of age. It is the feeling of the writer that the age of expectancy has been greatly increased, as many more patients beyond the age of fifty now coming up for examinations are found to have tuberculosis than many years ago.

In my office since January 1, 1942, until September, 1943, a period of twenty months, ninety-nine new patients were diagnosed as having tuberculosis. A majority of these had not been told previously they had the disease. Of this number, twenty-seven, or 27.2 per cent, were fifty years of age or older. Eleven of these were between the ages of fifty and sixty and thirteen were above sixty.

With these figures in mind, by various means I tried to find if others were meeting with a similar experience. The Anti-Tuberculosis League Clinic of Norfolk states that thirty cases were found to have tuberculosis between July, 1940, and July, 1942, that were beyond fifty years of age, sixteen white and fourteen colored. The Tidewater Memorial Hospital reports that out of three hundred and ninety admissions, eighty were beyond fifty years of age. The Chicago Municipal Tuberculosis Sanatorium admitted 1,154 patients in 1940; of this number one hundred and fifteen were over fifty years of age.

In trying to obtain comparative figures with twenty to twenty-five years ago, I found it very difficult, as very few figures were available in 1915. The National Jewish Hospital admitted four patients over fifty years of age in 1915, while in 1940 they admitted twenty-one. In 1915 our State Sanatorium at Catawba admitted three hundred and sixty patients, and, of these, twelve, or 3.3 per cent, were over fifty years of age. In 1940 they admitted five hundred and fifty-five patients, with sixty-two, or 11 per cent, over fifty years of age. At Blue Ridge Sanatorium, of those discharged in 1921, 6 per cent were over fifty years of age, but in 1940 it had risen to 18 per cent. In 1942, our State Department of Health reported four hundred and ninety-four deaths from tuberculosis beyond fifty years of age.

In Virginia in 1922 there were four hundred and twenty-five new cases reported in persons over fifty-years of age. In 1942 there were nine hundred and eight new cases reported in persons forty to fifty-nine years of age, and two hundred and forty-one over sixty years of age. The total number of beds for all forms of tuberculosis in the entire state is only 1,624. The cases reported over forty years of age were 1,050 in 1942 alone.

TABLE I

1922 Tuberculosis Deaths Reported from Eighty-eight Virginia Counties

	WHITE	COLORED	TOTAL
Male	352	382	734
Female	479	479	958
			1,692

1922 Tuberculosis Deaths Over 50 Years of Age

	WHITE	COLORED	TOTAL
Male	141	72	213
Female	152	60	212
			425

1942 Tuberculosis Deaths Over 50 Years of Age

	WHITE	COLORED	TOTAL
Male	187	95	282
Female	143	69	212
			494

New Cases Tuberculosis Reported in 1942

	AGE 40-59		AGE 60 AND OVER	
	MALE	FEMALE	MALE	FEMALE
White	363	207	111	83
Colored	140	99	24	23
	503	306	135	106

SANATORIUM BEDS	WHITE	COLORED	TOTAL
State	770	269	1,039
Municipal	393	192	585
	1,163	461	1,624

In 1915 in the State of Maryland, there were five hundred and thirty-four deaths reported from tuberculosis in individuals beyond fifty years of age. In 1940 it had dropped to three hundred and ninety-two. In North Carolina in 1915 there were seven hundred and five deaths from tuberculosis in individuals over fifty years of age; white, four hundred

*Read before the annual meeting of the Medical Society of Virginia, at Roanoke, Va., October 25-27, 1943.

and fifty-three; colored, two hundred and fifty-two. In 1940 there were only three hundred and fifty-eight; white, two hundred and twenty-one, and colored one hundred and thirty-seven. I am unable to explain this drop except that western North Carolina used to have many private sanatoria for treating tuberculosis, and patients came from far and near, believing that the climate played a great part in the treatment and cure of tuberculosis. Since this theory has been exploded, more patients are taking treatment nearer home.

TABLE II.—PULMONARY TUBERCULOSIS
Deaths, all ages and age 50 and over, and proportion at age 50 and over,
United States and certain States, 1915 and 1940

	1915			1940		
	PULMONARY TUBERCULOSIS DEATHS		% DEATHS AGE 50 + TO DEATHS	PULMONARY TUBERCULOSIS DEATHS		% DEATHS AGE 50 + TO DEATHS
AREA	ALL AGES	50 AND OVER	ALL AGES	ALL AGES	50 AND OVER	ALL AGES
U. S. Death Registration Area	82,853	17,386	21.0	55,576	19,217	34.6
White	70,514	15,778	22.4	39,888	16,579	41.6
Colored	12,339	1,608	13.0	15,688	2,638	16.8
California	4,754	1,092	23.0	3,544	1,440	40.6
White	-----	-----	---	3,069	1,305	42.5
Colored	-----	-----	---	475	135	28.4
Connecticut	1,445	281	19.4	543	222	40.9
White	-----	-----	---	504	216	42.9
Colored	-----	-----	---	39	6	15.4
Maryland	2,220	491	22.1	1,344	418	31.1
White	1,388	377	27.2	672	307	45.7
Colored	832	114	13.7	672	111	16.5

In the Death Registration Area in the United States for 1915, the rate was 21 per cent over fifty years of age. In 1940 it had risen to 34.6.

The tuberculosis death rate in Virginia for 1915 was 182.4. In 1942 this had dropped to 55.9. All these figures prove that people with tuberculosis are living much longer than formerly.

The reason may be that the standard of living has been greatly increased; better food, better clothing and better housing for all classes. The building and developing of the sanatoria and all they stand for in the method of education, treatment and follow-up studies, has been the biggest contribution in lowering the tuberculosis death rate. Immunity also has played a vital part in increasing the expectancy of tuberculosis. The longer a people live with and fight tuberculosis, the better its individuals seem to resist the disease.

Various authors agree that the type of tuberculosis seen in the aged is different from that seen in the young adult. They differ, however, as to the form it takes. The writer feels that there is a vast difference clinically in the tuberculosis seen in the two age groups. In the young adult, the disease is usually the infiltrative type, active and progressive, yet the clinical symptoms may be mild; slight cough,

Fig. 1.—Mrs. W., living in a boarding house. Aged 65.

very little expectoration and only slight elevation of temperature, slight loss of weight, except in the acutely ill patients. If not treated, these may go

on into the ulcerative and exudative stage. If cavities develop, they are usually small and single.

A large percentage of both groups complain of a tired, weak feeling. The older group complain of a marked loss in weight, usually to the degree of emaciation; the cough is usually very severe and expectoration profuse, due to a mixed infection. The old

Fig. 2.—Mrs. T., housewife. Aged 67.

inactive fibroid type may not have any cough except with a cold. In the older type when cavities develop, they are usually large and multiple. There is much fibrosis and calcification. The older type may have an acute spread and develop into the pneumonic type. Shortness of breath may be due to several causes: physical exhaustion, anoxemia, as a result of asthma, atelectasis, fibrosis, emphysema, and bronchiectasis. Chronic asthmatics as a rule do not develop tuberculosis, but tuberculous patients may develop asthma, probably bacterial in origin, due to mixed infection.

Of the twenty-four cases studied, three had a systolic blood pressure over 150. Nine of these gave a history of expectorating blood, from as much as a streak to a mouth full, but none of them gave a history of having a large hemorrhage. This was a little over 37 per cent. These figures correspond with some figures published by the writer a few years ago. Sixteen of the group were classified as chronic fibrosis, probably without cavity formation, or if present they were very small. Five of the group were classified as chronic infiltration, active, with cavity formation, and two as the acute pneumonic type. One of these died in about three months; the other is responding to collapse therapy. Of this entire group, there were six that gave shortness of breath and cough as their chief complaint. It was difficult to differentiate some of this from true asthma and anoxia, due to the previously mentioned causes.

The acute case still under treatment might be of some interest. This is a white male, age fifty-eight, by occupation a salesman who had not been feeling well for about two months. He was taken with a chill, followed by a high fever. It was thought he had pneumonia, probably of the virus type. He was given one of the sulfa drugs for about ten days with no benefit; one sample of sputum was negative for

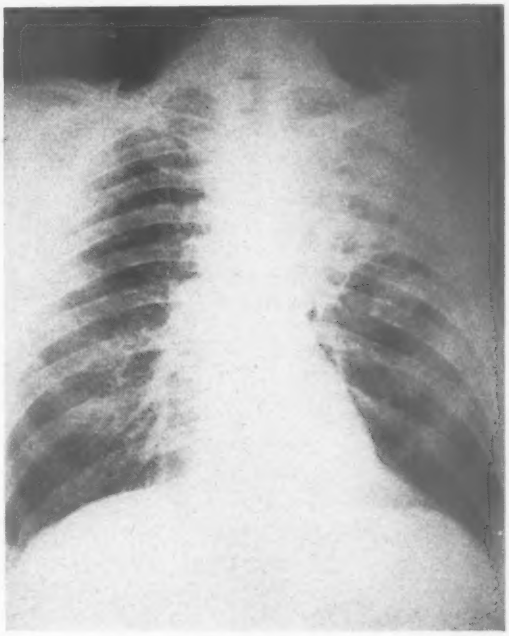

Fig. 3.—Mr. W., salesman. Aged 58.

acid fast bacilli. X-ray of his chest revealed an infiltration of the upper half of the left lung, rather suggestive of a tuberculous pneumonia, though the roentgenologist, in view of the man's age and acute onset, thought virus pneumonia should be considered. I saw him in the third week of the disease

and the diagnosis was somewhat doubtful, though tuberculosis appeared most probable. A daily examination of the sputum was ordered, and the sixth specimen was found loaded with tubercle bacilli. He was started on collapse therapy; that is artificial pneumothorax, and his temperature came down in about two weeks. I cannot over-emphasize the importance of examining numerous samples of sputa where tuberculosis is suspected. A negative sputum means nothing. A positive sputum proves tuberculosis to be present, though the patient may not be acutely sick at the time.

Where numerous sputa have been negative, I would suggest that culture be attempted. A. W. Bengtson, of Catawba Sanatorium, reports that he has obtained 31.16 per cent positive cultures from the sputa that were found negative on smear over a period of two years. On pleural effusion he has gotten a positive culture in 57.2 per cent over a period of eight years that were negative to smear. I feel this is an important step forward in examining sputa and pleural effusions, and should be done when possible.

NOTE: Since reading the above paper, one of the cases reported has passed away. He was a man, sixty years of age, who had returned from the sanatorium, apparently in excellent shape, after spending about six months. He had gained about fifteen pounds in weight. About three weeks after being at home, he developed acute upper respiratory infection, high fever, accompanied with uremia. He died in about four days with terminal pneumonia.

This man did not die a tuberculosis death, and it will not be classified as such. I feel this is the way many of our chronic tuberculous cases terminate. Consequently, the statistics do not show the real number of deaths from tuberculosis in the aged.

DISCUSSION

Knowing we have these old people with tuberculosis, and the number seems to be increasing, what can be done about it? Those of us who have worked with tuberculous patients know that it is almost impossible to teach an elderly patient to protect himself or others. They cough, sneeze and expectorate at will, without making any attempt to cover their mouths, or to destroy the sputa. Since only a small percentage are sick enough to be confined to bed, this makes them all the more dangerous. I cannot agree with Norton that most old people with tuberculosis succumb rather rapidly. I feel that there should be sufficient beds in our state and municipal sanatoria to take care of all persons with active tuberculosis, or with a positive sputum. I know it is the policy of the state sanatoria to take first the young and the early cases, the ones that can be salvaged and restored to health, and leave the old and advanced cases to shift for themselves. I have always felt that this was the weakest link in our tuberculosis program. We should try to destroy the source of the infection, while at the same time we are trying to treat those infected. It is not scientific, not economical, and not to the best interests of the public for the old people and the advanced cases to go untreated. I feel they all should be isolated, either in sanatoria or convalescent home.

In conclusion let me emphasize the importance of examining carefully all old people with a chronic cough, and study the sputum by smear and culture. The number of old people with tuberculosis is on the increase. More beds should be provided for their care, and all should be isolated.

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PERSONAL CORRESPONDENCE

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DISCUSSION

DR. NICHOLAS G. WILSON, Norfolk: The subject presented by Dr. Harrell is very pertinent and deserves our earnest consideration. Unquestionably, today, a larger number of people over fifty years old are found to have pulmonary tuberculosis than were reported two or three decades ago. However, it does not seem reasonable that, while the mortality rate has so markedly declined, the incidence at any age should have increased. To account for the larger number of reported cases occurring in elderly people, Dr. Harrell has mentioned the progressively advancing life expectancy, increasing resistance to the tubercle bacillus, and lowering the death rate by more intelligent care of the tuberculous.

I agree with him when he tells us that as a rule most elderly people tolerate tubercular infection very well; and clinical experience seems to indicate that in this increased tolerance is found the probable reason for the greater number of reported cases in those past middle age.

It may be recalled that a few decades ago, before the X-ray film became the essential part of a chest examination, the diagnosis of chronic bronchitis was accepted at its face value and it was not until physicians generally became tuberculosis-minded that the more serious underlying condition was more frequently recognized. Present day doctors are unwilling to accept a diagnosis of chronic bronchitis with its accompanying bronchiectasis, emphysema, and often asthma, until proven by exhaustive examination.

In their monograph, Hawes and Stone quote F. T. Lord and R. C. Cabot as having said that there is no such entity as chronic bronchitis and that every such diagnosis is one mistaken for bronchiectasis, heart disease, or tuberculosis. While this opinion represents an extreme view of the matter, any opinion expressed by two such eminent clinicians must be respected.

Very few of us doubt the existence of chronic bronchitis, though we have to admit the co-existence in most cases of bronchiectasis and emphysema, and it is this usually long standing condition that all too often masks tuberculosis. Not infrequently, the X-ray film is not sufficient evidence on which to base a diagnosis, which then depends on a positive sputum.

Hawes reports one case of supposed proven chronic bronchitis in which the fortieth specimen was found loaded with tubercle bacilli. Dr. Harrell has reminded us that examination by the culture method would have shortened the period of doubtful diagnosis.

While it is possible for tuberculous infection to occur at any age, an overwhelming proportion takes place in early life; and in those instances in which it is first discovered in late life, a carefully obtained history—especially of childhood contacts, with unexplained periods of debility accompanied by "slow fever", malarial fever, or "walking typhoid" in early life—will likely indicate the real period of invasion.

Therefore, taking these facts into consideration, it seems probable that the principal factor involved in the apparent increase in the occurrence of tuberculosis in elderly people is greater accuracy in the diagnosis of obscure chronic pulmonary disease.

DR. R. L. RAIFORD, Franklin: I enjoyed very much Dr. Harrell's discussion of what I think is one of the most timely subjects of this day.

I especially want to emphasize Dr. N. G. Wilson's comments on chronic bronchitis of the aged. I have in mind a very respectable old white lady whom I knew had chronic pulmonary tuerculosis, but could never convince her that this was the case. She lived for over fifteen years after the onset of her cough and was able to do an unusual amount of work for a person of her age. She had many children and grandchildren and, because we could never induce her to take any form of treatment or even the most meagre precautions, she, like Dr. Wilson's colored woman, almost wrecked the family. Several died; several others were treated in the State Sanatoria and are now in various stages of health. This saintly old lady died at the ripe old age of eighty-five after having become the unrealized source of tuberculous infection of many bright young people.

DR. B. B. BAGBY, JR., Richmond: I have no figures except on white men. In my white men's ward at the hospital I have approximately fifty-three men, of whom at least twenty are over fifty years old.

DR. HARRELL, closing discussion: I wish to thank Drs. N. G. Wilson, Raiford and others for their discussion.

The State Sanatoriums are doing a great job in the fight against tuberculosis. I hope they will continue to do an even greater job. However, there is one thing I do not understand—why patients, after they are discharged from the sanatorium, do not consult their physicians when they return home. I dare say not 25 per cent of the ex-sanatorium patients consult physicians regularly unless they are pneumothorax cases or are taken acutely sick. I get the impression that they get a smattering idea of tuberculosis while in the sanatorium and think they know more than the average practitioner and wish to be their own doctor.

If possible, it should be emphasized on them as strongly as possible the importance of having a regular check-up.

In regard to old cases being in the homes, we know that children are very susceptible to tuberculosis, and as a rule they can stand one infection fairly well, but they cannot stand constant re-infection. Therefore, I feel it necessary that the chronic case should either be isolated in the sanatorium or in a convalescent home. If they can produce, let them continue to work, but keep them under supervision and in isolation from their families and others.

MEDICAL PROGRESS DURING THE LAST SIXTY YEARS*

M. O. BURKE, M.D.,
Richmond, Virginia.

Sixty years ago medical education in the United States was hampered by too many schools with a low curriculum. There were five medical schools in Louisville, Kentucky, at that time.

There were no educational requirements for entrance to these schools, and the courses consisted of two years of six to eight months each year. Some of the schools allowed their students to graduate in one year if they could pass the examinations. The subjects taught were:

Theory and Practice of Medicine.
General Surgery.
Gynecology and Obstetrics.
Chemistry.
Materia Medica and Therapeutics.
Physiology.
Anatomy.

Embryology, Histology, Pathology and Bacteriology were referred to, but little time was alloted to them.

"In 1890 there were 133 medical schools with 4,454 graduates. In 1905 there were 160 medical schools with 5,606 graduates."

The Council on Medical Education succeeded in raising the standard of medical education and "since 1933 there have been in the United States sixty-six approved four year schools, one offering only clinical courses and ten schools of the basic Medical Sciences". "In the seventy-seven medical schools in the United States, including the school of the basic medical sciences, there were 21,379 students and 5,275 graduates in 1941."[1]

The graduate in medicine sixty years ago was only an apprentice in medicine; by many years of close attention to clinical experience, hard work and post-graduate courses he became a doctor.

Many of our graduates went to England, France and Germany to finish their education and brought back the knowledge gained to improve our work in the United States.

During the last seven years our medical teaching has been sought by the graduates of the European schools.

The doctor sixty years ago knew little of the causes of disease; his mission was to cure his patient if he could, and to relieve suffering as much as possible.

He was more intimately associated with his patients than the average doctor of today; frequently his sympathetic advice was worth more than the medicine he prescribed. He knew the reactions of his people in health and in sickness and was a close student of human nature. Having no instruments of diagnostic precision, his five senses were highly developed and his general comprehension was acute: he learned more medicine from clinical experience than from books.

These were the "horse and buggy days" but he often went on foot and carried his saddle bags on his shoulder. He filled his own prescriptions and used but few drugs and these for their therapeutic effect.

He met emergencies as they arose as best he could with faith in himself as an agent of a Higher Power.

Sir William Osler, a product of the old, and a pioneer of the new school of medicine, graduated in Canada when medical teaching was at a lower ebb than it is today; continued his studies in Germany, became Professor of Clinical Medicine in the University of Pennsylvania, then Professor of Medicine in John Hopkins Medical School and Hospital.

In 1905 he left his native land and adopted home for a more ancient Chair of Medicine in Oxford, England. He always kept a little ahead of the times. He made himself master of every new discovery in medicine. His *Practice of Medicine*, published in 1895, was up to date in etiology, morbid anatomy, symptomatology, diagnosis and prognosis.

He was the greatest teacher of internal medicine in America and in Europe.

The medical student today has all of the scientific medical discoveries since Aesculapius, collected, condensed and revised for his instruction. He has four years of carefully supervised teaching, two years of hospital work for assimilation before he is called upon to demonstrate his ability as a doctor. He has yet to correlate his scientific knowledge with common sense and human nature and he must realize

*Prepared for Medical Society of Virginia meeting in Roanoke but, as unable to attend, read before Richmond Academy of Medicine, November 23, 1943.

that he is called upon to treat an individual that has a disease instead of a disease that has the individual; else he may cure the disease but kill the patient.

It was once thought that disease developed spontaneously in the body.

The old idea that humors were the seat of disease was superceded by the theory that the nervous system controlled disease.

"In 1801 Bichat claimed the seat of disease was not in the organs but in the tissues or fabrics of which they were composed."[2]

Hahnemann, the father of homeopathy, taught that the duty of the physician was to heal by giving remedies in minute doses that produced the same symptoms as the disease, and to disregard the cause of the disease.

At the beginning of the nineteenth century medicine was a theory and the practice of medicine an art. By the middle of the nineteenth century the theory of medicine was rapidly changing and science began to hunt for a definite cause of disease.

The study of physiology and pathology stimulated a research for the cause, cure and prevention of contagious diseases.

In the year 1796 Jenner vaccinated a boy 8 years old with cowpox and after his recovery, with smallpox, with the result that he did not take smallpox.

Oliver Wendell Holmes' classical paper on the contagiousness of Puerperal Fever appeared in the *New England Quarterly Journal of Medicine* in 1843.

"Louis Pasteur's discovery that living organisms are the cause of fermentation is the basis of the whole modern germ theory of disease and of the antiseptic method of treatment."[3]

Koch in his bacteriological research discovered the cause of tuberculosis in the year 1882 and other germs later.

Lister established the importance of antiseptics. Jenner, Pasteur, Koch and Lister laid the foundation of preventive medicine. Bacteriology, chemistry, dietitics, sanitation, endocrinology and immunology have built and are still building the superstructure.

The latter part of the last century, filled with the discovery of the cause of contagious and infectious diseases, continued into this century and was no less startling than the means of preventing those diseases and the specific cures for others.

There has been a revolution in diagnosis.

The four cardinal methods of diagnosis are just as important as ever.

Mentally dividing the human body into methodical regions or zones and separating the abnormal from the normal findings, carefully compiled and condensed histories and from these making a tentative diagnosis—to be verified by various laboratory findings.

The laboratory has grown from a shelf or table with an alcohol lamp, a microscope and a few reagents and test tubes to a well equipped department with trained technicians.

The first x-ray picture that came to America in 1896 was that of a hand on one finger of which was a ring. It was thought that the x-ray would be valuable in diagnosing fractures and foreign bodies. Roentgenology is today an important specialty. Cardiology is another progress.

The bronchoscope and esophagoscope, introduced by Jackson, are playing a most important part in medicine.

The cystoscope is indispensable to the urologist.

Tuberculosis headed the list of killers for many years. Koch discovered the cause, Bacillus tuberculosis, 1880-1882. No specific cure has been found.

By sanitation, sunlight and common sense thousands have been saved from infection, and many of those infected have had their usefulness prolonged.

Malaria, the scourge of the South since the settlement at Jamestown, has been greatly weakened but not quite subdued in the United States. It "still rages in China, India, and the tropical islands". Malaria existed in the old world more than 2,000 years ago. "The Surgeon General says that 800,000,000 people suffer from malaria every year".[4] For several centuries it was thought that malaria was contracted from the miasma from swamps.

The specific remedy for malaria was known 240 years before the discovery of the plasmodium in the blood by Laveran in 1880. Fifteen years later Sir Donald Ross demonstrated the developmental changes of the plasmodium in the mosquito, and three years later Bignami, Basteanelli and Grassi demonstrated by actual experiment upon man that anopheline mosquitoes transmitted malaria.

Quinine, isolated from Cinchona bark 1820 by Pelletier and Courventou, has been the sheetanchor in treating malaria. Plasmochin is used with quinine

to kill the gametocytes. Atabrine has lately been introduced as a specific for malaria, but we are still dependent upon quinine.

Diphtheria is caused by a bacillus described by Klebs and Löffler in 1883-84. The death reaper continued to gather his harvest for nine years until Behring in 1892 dulled the scythe with an antitoxin serum for diphtheria and introduced the possibilities of serum therapy.

Yellow fever originated in West Africa, was carried to Brazil and the tropics and appeared in New York 1668. There were epidemics of yellow fever in the United States from 1797 to 1899. These epidemics occurred during the Summer and Fall, disappearing with the coming of frost and freezes, which led to the belief that mosquitoes conveyed the disease. Sanarelli claimed that the Bacillus icteroides was the cause of the disease. "Agramonte did not believe that the specific germ of yellow fever was yet discovered."[5] Many mistaken claims of the etiology of yellow fever were made and many investigators lost their lives.

"In 1901 it was demonstrated that the cause was a filterable virus in the body fluids and is conveyed by the Aedes Egypti mosquito."[6]

We owe an everlasting debt of gratitude to Walter Reed and his co-workers who in 1900 demonstrated conclusively that the disease was conveyed by the mosquito; and to General Gorgas for his brilliant work of sanitation in Havana, Cuba, and the Canal Zone. "The work in Havana was begun in February, 1900, and the last case of yellow fever occurred in September, since which date the city has been practically free from yellow fever."[7]

In Panama conditions were such that it took sixteen months before the disease disappeared. "There has been no return."

"An effectual vaccine for immunization against yellow fever has been obtained."[8]

Typhoid fever, an enemy for more than 200 years, has been practically subdued.

In the year 1880 Eberth discovered the bacillus typhosus. By the use of disinfectants and sanitation the number of cases was greatly reduced. In 1909 Wright and Pfeiffer introduced a specific inoculation. In 1916 para typhoid was added and, since compulsory inoculation was established in the Army and many of the schools, the disease has almost disappeared.

As to pneumonia, we have made some progress in the treatment of this disease with fresh air and oxygen, the typing of pneumococcic and serum for the special types. Since 1936 the sulfa drugs alone or in combination with serum have saved many lives.

Syphilis is claimed by some writers to have been carried by Spanish sailors from Hayti in 1493. Others claim that the disease existed in Europe and Asia two thousand years ago.

"All efforts at discovering the cause failed until in 1905 Schaudinn demonstrated the presence of a Spirochete in the lesions."[9]

"In 1911 Ehrlich announced the discovery of an arsenical compound with special spirocheticidal power."[10]

Wassermann introduced his complement fixation test. Modified arsenicals and bismuth have been added since 1910. The States are requiring a test and treatment of all suspected cases and a serological test of all applicants for marriage license.

Banting and his co-workers have made the paths for diabetics much smoother. The blood sugar and sugar tolerance tests have enabled us to more accurately regulate their diets.

Minot and Murphy (1926) introduced the liver diet for pernicious anemia, and Minot and Cohn (1927) developed an effective liver extract which controls this much dreaded condition.

Hookworms sucked the blood of the lower classes of people in all warm climates for 300 years before active steps were taken to eradicate the disease. Stiles began his valuable investigation and crusade against hookworm 1901. By sanitary and therapeutic measures the disease can be controlled. Thymol has been replaced by carbon tetrachloride as more efficient in clearing the worms from the intestines.

Deficiency diseases can be greatly benefited or cured by vitamins if treated in the early stages. They can be prevented by eating the proper food. Take pellagra, for instance, as an example of the deficiency diseases:

"Pellagra was endemic in Spain 1735, existed in Italy in 1750, and described in 1771 by Frapoli who gave it the name pellagra (roughskin)."

"The disease generally is supposed not to have been recognized in this country until 1906; however, sporadic cases were reported in Massachusetts and New York in 1860."[12] Dr. Searey, of Alabama, re-

ported the disease during the latter part of the 19th century or early in the 20th century.

It was first thought to be due to spoiled maize, then due to a diet of fat meat, corn bread and molasses, "later to deficiency in protein supply".[8]

Clinicians have obtained brilliant results from nicotinic acid. Vitamin therapy is a progress of this century.

We have diseases arising from hyper and hypo secretions of the endocrine glands.

Exophthalmic goiter is characterized by disarrangement of the thyroid gland and hyper function. In 1923 Plummer pointed out that iodine has a remarkable effect in this disease, and in preparing patients for operations.

Myxedema and cretanism, examples of hypothyroidism, are benefited and sometimes cured by feeding thyroid extract.

Gigantism is due to hyperfunction of the anterior lobe of the pituitary gland.

Dwarfism and Simmond's disease are due to hypofunction of the pituitary gland and are sometimes benefited by active anterior pituitary preparations. Theelin, isolated by allen and Daisy in pure crystalline form, has been a great blessing to suffering women.

"At the beginning of the 20th century the drug addicts numbered 250,000 to 300,000 in the United States. By 1912 every state except Delaware had an anti-narcotic law. The Harrison Act became effective in 1915."[13] Since 1900 the number of addicts has greatly decreased.

The sulfa drugs and penicillin have been the most spectacular discoveries of the present century and are playing a most important part in the present war. It is claimed that the sulfa drugs, blood plasma and penicillin have greatly reduced the death rate of men wounded in battle.

Until we can unravel the fabric that binds the physiological functions of this intricate human system and can reconcile the psychic with the mechanical, chemical, electrical and nervous control of the individual, we can not hope to relieve the patient of the numerous ills for which the doctor is consulted.

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Forum on Allergy.

The seventh annual forum on allergy will be held in the Hotel William Penn, Pittsburgh, on January 20-21, 1945. This is a meeting to which all reputable physicians are most welcome, and where they are offered an opportunity to bring themselves up to date in this rapidly advancing branch of medicine by two days of intensive post-graduate instruction.

For further information, write Jonathan Forman, M.D., Director, 956 Bryden Road, Columbus 5, Ohio.

Virginia League for Planned Parenthood.

At a meeting of the League on October 6th, Dr. H. Hudnall Ware, Jr., Richmond, was elected president. The medical advisory committee is composed of Dr. M. P. Rucker, Richmond, chairman; Dr. C. J. Andrews, Norfolk; Dr. B. B. Bagby, Richmond; Dr. Dean B. Cole, Richmond; Dr. A. M. Groseclose, Roanoke; Dr. W. R. Payne, Newport News; Dr. F. O. Plunkett, Lynchburg; Dr. T. J. Williams, University; and Dr. Ware.

CARE OF PRE-SCHOOL CHILDREN OF WAR WORKING MOTHERS—HEALTH DEPARTMENT STUDY OF THEIR PHYSICAL CONDITIONS*

WM. Y. GARRETT, A.B., M.D., M.P.H.,
Health Officer,
Newport News, Virginia.

Physical examinations performed upon 59 children enrolled in the two day nurseries in the city indicate that two-thirds of this cross section of our pre-school population (ages 2-6 yrs.) have physical defects which are in need of medical or dental attention. These examinations were performed by Dr. Catherine Blumberg of the city health department.

The most common defects were dental caries and diseased tonsils. Twenty children were found to need dental attention and removal of the tonsils was indicated in eleven. Other defects discovered were poor posture, glandular disorders, skin conditions, malnutrition, colds, flat feet, etc. In twenty children no defects were discovered.

The children included in this study are those whose parents are engaged in defense work. The fathers of several are in the armed services. The number examined (59) is too small to make any statistically significant statements concerning the physical health of our pre-school children in general, but Selective Service Boards have reported unusually high rejection rates at induction centers and school physicians report that school children are not in the best of physical condition as regards teeth, tonsils, nutrition, eyes, etc., when they enter school. On the basis of these facts, it would seem that a very high percentage of our "tots" are suffering from undiscovered defects, which, if discovered and corrected early, would prevent many disabling conditions of later years.

We have heard much of late of expanded social security; of "cradle to grave coverage" in Britain, and of "womb to tomb coverage" in America, as we go our friends across the sea one better. The American public has been sold on the value of pre-natal care for expectant mothers, of good obstetrics, and of medical supervision of infants. This has resulted in the saving of countless thousands of lives and the prevention of untold suffering. This job has been so well done that in many of our large metropolitan centers puerperal sepsis (infection of mother associated with childbirth) has become quite a rarity. The infant death rate has likewise experienced a tremendous reduction.

There is need for health departments in general and the Newport News Health Department in particular to strengthen and greatly expand programs for the discovery and correction of physical defects among pre-school children. There is need for health departments to continually impress upon the public, and the medical and dental professions, the importance of periodic physical examination of everyone. In no age group will the annual checkup prove more beneficial than among pre-school children. The defects discovered in this age group can for the most part be readily and inexpensively corrected.

A summary of the defects discovered in this study appears in the following table.

	White	Colored	Total
Number examined	42	17	59
Number with defects	28	11	39
Number of defects	41	15	56
Number without defects	14	6	20
Per cent having defects	67%	65%	66%
Types of defects			
Dental caries	13	7	20
Diseased tonsils	7	4	11
Skin disorders	5	0	5
Other defects	16	4	20

Parents of those children having physical defects were notified by the public health nurses and advised to consult their physician or dentist. In cases where the parents, although employed, are unable to finance the correction of these defects, the Social Service Bureau, after investigating each case, gives assistance.

SUMMARY

1. Fifty-nine children, varying in age from 2-6 years, were examined by the Newport News Health Department.

2. These are children placed in the day nurseries of Newport News while their mothers are engaged in activities connected with the war effort.

3. Two-thirds of those examined had remedial physical defects. Dental caries and diseased tonsils were the most prevalent conditions discovered.

4. There is great need for periodic examinations of pre-school children. More attention to children's dentistry must be given.

*Prepared for presentation to the Child Welfare Committee of the Newport News Office of Civilian Defense, and deals with the physical examinations of this younger age group of children in May, 1944.

ARE SOLUTIONS OF SULFA-DRUGS SELF-STERILIZING?

F. J. VON GUTFELD, M.D.,*
Richmond, Virginia.

The question whether sulfa-drugs are self-sterilizing sounds rather paradoxical; nevertheless, only a small minority would hesitate to answer it in the affirmative.

The fact, however, that such a question can reasonably be asked involves the possibility of a doubtful or even a negative answer, at least for special cases.

In considering the problem two sets of facts should be kept in mind: (a) different disinfectants have different germicidal power depending on their chemical constitution, concentration, pH, temperature, etc.; (b) the resistance against the action of disinfectants varies with different microorganisms according to their kind, ability of spore-formation, etc.

The following observation seems to be noteworthy, especially in view of its practical bearing and the conclusions to be drawn.

On October 19, 1943, a four-ounce screw-cap bottle containing 80 cc. distilled water was autoclaved (20 min. at 121° C.). After cooling to room temperature, 0.2 g. of dry sulfapyridine were added to the sterile water. The sulfapyridine was contained in an ordinary card-board box. Under these circumstances it was, of course, supposed that the sulfapyridine contained living microorganisms. The purpose of the experiment was to observe whether the sulfapyridine solution would undergo "self-sterilization". It was planned to transfer a small amount of the sulfapyridine solution from time to time to a nutrient medium in order to check the possibly occurring self-sterilization. The sulfapyridine solution was kept in a cabinet.

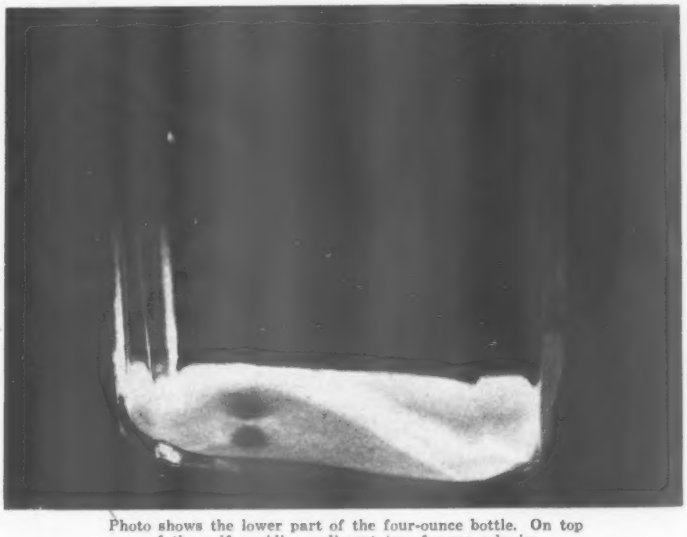

Photo shows the lower part of the four-ounce bottle. On top of the sulfapyridine sediment two fungus colonies.

On November 23, 1943, five weeks after the solution had been prepared, the first test for sterility was scheduled. The performance of this test, however, had become unnecessary, since the solution presented the following picture: the bottle contained a crystal-clear liquid, and the white sediment of undissolved sulfapyridine bore two dark-gray fungus colonies about 3 mm. in diameter (photo from 11-24-1943).

The fungus colonies were transferred one to peptone water and the other to corn meal agar, and later identified as belonging to the genus Hormodendrum.

Whether the fungus was able to grow on sulfa-

*From the Department of Bacteriology and Parasitology, Medical College of Virginia, Richmond.

pyridine as its only source of nutriment, or whether the sulfapyridine powder may have contained traces of impurities sufficient for the growth of the two fungus colonies need not be discussed here, since it has no bearing on our question.

As a matter of fact, it is to be stated that a saturated solution of sulfapyridine (not previously sterilized) when prepared with sterilized distilled water in a sterilized bottle not only did not become sterile after five weeks, but even allowed the growth of two fungus colonies.

For practical purposes the conclusion has to be drawn that certain bactericidal agents, especially the sulfa-drugs, should be sterilized by suitable methods since it is not safe to rely upon their "self-sterilization".

SUMMARY AND CONCLUSIONS

In a saturated solution of sulfapyridine in sterilized distilled water in a sterilized bottle two fungus colonies developed on top of the sulfapyridine sediment. Therefore, "self-sterilization" should not be relied upon, and the chemicals should rather be sterilized previously by a suitable method.

Annual Post-Graduate Course at University of Virginia Hospital.

Below is given the program for the post-graduate course in diseases of the eye, ear, nose and throat to be given at the University Hospital early in December:

Tuesday, December 5, 1944

9:30-10:30 A. M.—Interpretation of Roentgenograms.
Dr. Frederick M. Law, Roentgenologist, Manhattan E. E. and T. Hospital, New York City.

10:45-11:45 A. M.—Carcinoma of the Larynx, illustrated by motion picture films.
Dr. Paul H. Holinger, Assoc. Prof., Broncho-Esophagology, Dept. Otolaryngology, Illinois University.

12:00-1:00 P. M.—The Treatment of Acute Upper Respiratory Tract Infections.
Dr. Russell L. Cecil, Prof. Internal Medicine and Clinical Medicine, Cornell University Medical School, New York City.

1:00-2:00 P. M.—Lunch.

2:00-3:00 P. M.—The Medical Treatment of Chronic Otitic Suppuration.
Dr. John R. Page, Surgeon Director, Manhattan E. E. and T. Hospital, New York City.

3:15-4:15 P. M.—Successful Operations on the Nose and Throat; Indications and Management of Same.
Dr. Joseph D. Kelly, Surgeon Director, Manhattan E. E. and T. Hospital, New York City.

4:30-5:30 P. M.—The Practical Aspects of Fluid and Acid Base Balance in Children.
Dr. McLemore Birdsong, Asst. Prof., Dept. Pediatrics, University of Virginia.

8:00 P. M.—Tumors of the Bronchi, illustrated with motion picture films.
Dr. Paul Holinger.

Wednesday, December 6, 1944

9:30-10:30 A. M.—The Surgical Treatment of Chronic Otitic Suppuration.
Dr. John R. Page.

10:45-11:45 A. M.—Question and Answer Hour on Operations of Nose and Throat.
Dr. Joseph D. Kelly.

12:00-1:00 P. M.—Rheumatism.
Dr. Russell L. Cecil.

1:00-2:00 P. M.—Lunch.

2:00-3:00 P. M.—Interpretation of Roentgenograms.
Dr. Frederick M. Law.

3:15-4:15 P. M.—Bronchial Obstruction, illustrated with motion picture films.
Dr. Paul H. Holinger.

4:30-5:30 P. M.—Postoperative Pulmonary Complications and Their Treatment by Postural Cough, Catheter Aspiration of the Trachea and Bronchoscopy.
Dr. Marion Lawrence White, Jr., Asst. Prof., Dept. Surgery and Gynecology, University of Virginia.

6:30 P. M.—Cocktails and dinner at Farmington Country Club.

Address.
Rear Admiral Ross T. McIntire, Surgeon General of the U. S. Navy, Washington, D. C.

During the post-graduate course, lectures on the eye will be given on December 7 and 8. The invited faculty and the subjects they will discuss are:

Dr. James W. White, New York—Muscular Anomalies.
Dr. Paul A. Chandler, Boston—Disorders of Lacrimal Passages, Glaucoma, and Cataract.
Dr. Wilfred E. Fry, Philadelphia—Affections of the Optic Nerve, and other subjects.
Dr. Wendell L. Hughes, Hempstead, N. Y.—Repair of Lacerations of the Lid, Socket Reconstruction, and Reconstruction of the Lower Lid.

ROCKY MOUNTAIN SPOTTED FEVER—A CLINICAL REPORT

HERMAN S. FLETCHER, M.D.,
and
JOHN P. LYNCH, M.D.,
Richmond, Virginia.

Rocky Mountain spotted fever is a severe disease with a variable mortality. No specific treatment is known. The potentialities of penicillin are still unknown. The following case report is written for the purpose of recording a case of Rocky Mountain spotted fever treated with penicillin.

Little A. L. C., a 2½ year old girl, was taken on May 17, 1944, with a fever, followed the next day by a macular rash, two weeks after a dog tick was found on her body. The rash was seen first behind the ears, next involving the limbs, and finally the body was covered with a generalized eruption. She was admitted to St. Luke's Hospital May 25, 1944, when her temperature was 103.4 degrees, pulse 130. There were no previous illnesses.

The physical examination revealed a well developed and nourished little girl, apathetic but obviously resenting handling as though her muscles were sore. The neck was not stiff, Kernig's sign was negative, lungs clear, heart and abdomen normal. The rash was maculo-hemorrhagic in character, being generalized except for the face and most marked on the extremities.

The laboratory work was as follows: Red blood cells 4,010,000, hemoglobin 74 per cent, white blood cells 22,700 with 88 per cent polynuclear neutrophiles, 11 per cent lymphocytes, and 1 per cent mononuclears. The urinalysis was not significant. The blood serum on admission agglutinated Proteus X-19, 1-200 dilution, and 1-800 six days later.

On May 26, the day after admission, penicillin, 5,000 Oxford units intramuscularly every three hours, was begun and continued day and night for five days for a total of 200,000 Oxford units. The temperature during all this time averaged 102 degrees and returned to normal with complete recovery June 5, nineteen days after the onset or eleven days after the beginning of penicillin treatment. Penicillin apparently had no effect on the course of the disease.

Colonel Turner Talks On Venereal Diseases.

At the panel discussion of venereal diseases, held by the New York Academy of Medicine, at New York City, October 12, Colonel Thomas B. Turner, MC, Director of the Civil Public Health Division, Preventive Medicine Service, presented a paper on the applicability of chemotherapy methods in the treatment of venereal diseases in military and civilian practice.

Citing the rapidly moving events in this field, Colonel Turner said they point more and more insistently to the practical usefulness of specialists in venereal diseases. In connection with syphilis he warned particularly against "treating the noninfectiousness" which he said had no meaning and denotes a dangerous doctrine since experience has shown that in early syphilis a patient is either cured or not, and if he isn't cured almost surely an infectious relapse will occur.

The venereal disease rate among soldiers stationed in this country is less than half the rate during World War I, said Colonel Turner, and one sixth the rate during the Civil War. This, he concluded, can only be interpreted as an accomplishment of American medicine, both military and civilian, and as treatment becomes more effective, more rapid and less dangerous, physicians should double their efforts to make these great advances available to all who need it.

CASE REPORT OF MATERNAL DEATH

MATERNAL HEALTH COMMITTEE,
MEDICAL SOCIETY OF VIRGINIA

The patient was a thirty-one year old colored multipara with three previous pregnancies who was seen at home for the first time when seven months pregnant. She was having uterine contractions, for which she was given morphine and nembutal. There was no vaginal bleeding. The nembutal was taken at intervals for the next three days with relief of the abdominal pain. The cervix did not dilate during this time and the patient was sent to a hospital on the night of the third day, at which time she was said to be in strong labor.

After admission to the hospital with three days of labor the cervix was two fingers dilated. The cervix was then manually dilated and the child delivered by version and extraction. The cervix is said to have been torn and a fibroid the size of an orange was found in the cervix. The blood loss was excessive. The patient ran a septic course in the puerperium and there were episodes of profuse bleeding. She was seen by a consultant about one week postpartum at which time the temperature was 103 degrees to 104 degrees Fahrenheit. A hysterectomy was done. The patient was given three transfusions of whole blood and placed on sulfathiazole. The course continued downhill and she died on the ninth postpartum day. No autopsy was performed and there is no note of a pathological examination of the removed uterus.

COMMENT

This has been classified by the committee as a preventable obstetrical death because of the absence of prenatal care and the methods of treatment employed.

If this patient had an orange sized fibroid in the cervix it is strange that there is no note in the information available to us concerning this tumor at the time of the hysterectomy nor a note concerning the pathological examination of the removed structures. This patient was only thirty-one years old and had had three previous pregnancies. It would be interesting to know the age of the youngest child as myomata are usually slow growing tumors. In any event, prenatal care with an adequate pelvic examination in the early months would have afforded an opportunity for detection of the tumor and arrangements could have been made for the proper method of delivery dependent upon the findings. An orange sized fibroid in the cervix usually indicates an abdominal delivery, because the tumor by virtue of its location in the cervix will most likely block the pelvis. If this were the case then with the onset of the premature labor, the child should have been delivered by Cesarean Section.

After admission to the hospital, because of the failure of the cervix to dilate, it was dilated manually from one or two finger dilatation and the child delivered by version and extraction. Manual dilatation of the cervix is a dangerous and deadly procedure, and should practically never be performed. The result is usually lacerations, hemorrhage, infection and death. There is practically no indication for this procedure in present-day Obstetrics. The course of the present patient after delivery is a common sequel to accouchement forcé. The therapy postpartum is probably not open to criticism, although if hysterectomy was necessary it probably should have been done in the first or second postpartum day. After admission to the hospital the patient should either have been left alone and treated symptomatically, or delivered by Cesarean Section if a fibroid blocked the pelvis or immediate delivery seemed essential (which is rarely the case in the absence of antepartum hemorrhage).

PUBLIC HEALTH

I. C. RIGGIN, M.D.,
State Health Commissioner of Virginia

The report of the Bureau of Communicable Diseases of the State Department of Health for September, 1944, as compared with the same month in 1943, and for the period of January through September, 1944, compared with the same period in 1943, follows:

	Sept. 1944	Sept. 1943	Jan.-Sept. 1944	Jan.-Sept. 1943
Typhoid and Paratyphoid Fever	20	30	102	164
Diarrhea and Dysentery	1,206	802	5,250	4,697
Measles	23	73	17,032	9,392
Scarlet Fever	128	90	2,117	1,229
Diphtheria	40	34	192	237
Poliomyelitis	249	10	604	41
Meningitis	11	10	449	731
Undulant Fever	0	2	32	28
Rocky Mountain Spotted Fever	12	9	76	51
Tularemia	2	5	38	39

THE PHYSICIAN AND NUTRITION

It is generally recognized that a large part of the population will consider seriously the advice given by the family physician. The general practitioner increasingly is taking the opportunity to encourage patients to develop better health habits. Counsel in more intelligent eating habits is one phase of this professional effort that perhaps needs emphasis at this time.

While the physician naturally is engrossed with the diagnosis and treatment of disease, he is becoming more and more impressed with the value of applied dietary practices by his patients for the development and maintenance of general health. He is realizing that mental depression, nervous instability, and other vague manifestations, to a degree at least, often are associated with malnutrition.

The success of the effort to combat nutrition problems depends upon the interest of numerous groups, including very definitely the medical profession. The family doctor realizes that giving patients vitamin capsules is not enough. Therefore, he is taking every opportunity to stress the importance of eating the foods which not only will give patients the vitamins, but the other thirty-odd elements known to be needed by the body.

Before 1912 the physician thought largely in terms of fats, carbohydrates, and proteins. Now the addition of ten amino acids, thirteen minerals, and at least seven vitamins makes the science of nutrition a bit more complex. But the practical application of nutrition facts is beginning to catch up with the science.

The benefits derived from better sanitation, prevention of epidemics, and other public health factors readily have been accepted by the medical profession as direct influences in lengthening the span of life. It is just as important to increase man's usefulness and decrease the burden of ill health by instructing him in a proper dietary regimen. And in this connection it is much more important for the public to have its interest increased and obtain the true facts as to normal and health-sustaining diets from the medical profession, rather than to get distorted advice from faddists and misinformed persons.

Immunization Virtually Eliminates Tetanus in Armed Forces.

Tetanus has been virtually eliminated from our armed forces as a result of compulsory immunization. Major General Norman T. Kirk, USA, Surgeon General of the Army says that not a single case has been reported among completely vaccinated troops and there has been only a handful of cases throughout the entire Army. These occurred prior to vaccination or before the immunization process had been completed. The Navy, which also requires tetanus immunization process, has had no cases of the disease among sailors or Marines wounded in combat up to September 15, 1944, according to the Navy Bureau of Medicine and Surgery.

The most recent account illustrating the value of tetanus immunization was given in the report of a Navy medical officer who served aboard a hospital ship on which 284 Japanese and 384 Americans, all wounded in the same engagement, were being treated. Fourteen cases of tetanus, ten of which were fatal, occurred among the Japanese. None of the Americans developed the disease. Army medical records indicate that the Japanese do not immunize actively against tetanus.

BOOK ANNOUNCEMENTS

Books received for review are promptly acknowledged in this column. In most cases, reviews will be published shortly after the acknowledgment of receipt. However, we assume no obligation in return for the courtesy of those sending us same.

Gynecological and Obstetrical Urology. By HOUSTON S. EVERETT, A.B., A.M., M.D., Associate Professor of Gynecology, Johns Hopkins University, and Associate in Gynecology, University of Maryland; Assistant Visiting Gynecologist and Gynecologist in Charge of the Cystoscopic Clinic, the Johns Hopkins Hospital; etc. Baltimore, The Williams and Wilkins Company. 1944. xv-517 pages. Illustrated. Cloth. Price $6.00.

Ventures in Science of a Country Surgeon. By ARTHUR E. HERTZLER, M.D., Halstead, Kansas. 1944. 304 pages. Illustrated. Cloth.

Technique in Trauma. Planned Timing in the Treatment of Wounds Including Burns. From the Montreal General Hospital and McGill University. By FRASER B. GURD, M.D., C.M., and F. DOUGLAS ACKMAN, M.D., C.M. In Collaboration with John W. Gerrie, M.D., C.M., Edward S. Mills, M.D., C.M., Joseph E. Pritchard, M.D., and Frederick Smith, M.D. Philadelphia, J. B. Lippincott Company. 1944. vii-69 pages. Illustrated. Cloth. Price $2.00.

The importance of burns and other wounds in both military and civilian life has greatly increased during the past five years. Intensive study of the problems presented by such injuries has resulted.

In this monograph the authors describe a large number of wounds and burns treated in the Montreal General Hospital. The basic principles of immobilization and infrequent changing of occlusive pressure dressings advanced by Allen and Koch in 1942 are followed. To these principles are added planned timing of treatment, the use of Operational Charts, attention to the physiological requirements of the patient and team work.

By means of a carefully conducted clinical study the authors have emphasized the correctness of certain sound principles and have made a very definite contribution to clinical research in this important field of therapy.

FRANK P. COLEMAN,
Major, Medical Corps.

Minor Surgery. Edited by HUMPHRY ROLLESTON and ALAN MONCRIEFF. Philosophical Library, New York. 1944. viii-174 pages. Illustrated. Cloth. Price $5.00.

The busy general practitioner is always in need of a quick and ready reference in managing everyday minor surgical problems. The eighteen contributors to this book offer help and guidance in many instances where the practitioner must rely upon his own knowledge for the immediate proper care of the lesion in order to forestall serious later consequences.

It has been prepared primarily for the general practitioner; however, it is rather broad in scope in that some surgical problems described are in reality major surgical procedures and had best be treated by a senior surgeon. The repair of lacerated tendons and the ligation and injection of varicose veins under average circumstances are not managed by men doing general practice. The hopeless outlook for restoration of function of the hand after severance of the flexor tendons is not shared by many American surgeons. The contraindications to the injection treatment alone or in combination with ligation in the treatment of varicose veins are not emphasized.

The minor surgical procedures have few accompanying illustrations which would add much to the value of the book. The subject matter is brief, but it offers quick and valuable reference material.

FRANK P. COLEMAN,
Major, Medical Corps.

New Books.

The following are recent additions to the Library of the Medical College of Virginia, Richmond, and are available to our readers under usual library rules:

Best and Taylor—The living body. Rev. ed. 1944.

Bodmer—The loom of language.

Bondar, D. comp.—Simplified Russian method, conversational and commercial.

Brumley—A textbook of the diseases of the small domestic animals. 4th rev. 1943.

Council on pharmacy and chemistry— Annual reprint of the reports of the Council on Pharmacy and Chemistry of the A.M.A. 1943.

Crain, ed.—Teacher of business. 1944

Dandy—Intracranial arterial aneurysms.

Dodge—Diseases and pests of ornamental plants. 1943.

Gunther—Practical malaria control.

Handbook of Roentgen Diagnosis—The gastro-intestinal tract. 1944.

Horney—Self-analysis. 1942.

Knaysi—Elements of bacterial cytology.

Kracke—Diseases of the blood and atlas of hematology. 2nd ed. 1941.

Langenscheidts—Taschenwörterbuch (Pocket dictionary).

Levy—Experimental chemotherapy of histoplasmosis in white mice (Thesis)

Lewis—The executive's desk book.

McCready—On the influence of trades, professions, and occupations in the U. S. in the production of disease.

VIRGINIA MEDICAL MONTHLY

Official Publication of the Medical Society of Virginia

(Founded by Landon B. Edwards, M. D., April, 1874)

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VOL. 71 NOVEMBER, 1944 No. 11

The New President

YOUR new president, Henry Bearden Mulholland, was born in Knoxville, Tennessee, January 9, 1892. His early education was completed in the public schools of Knoxville, Tennessee and Washington, D. C. Family ties brought about a change of residence to Canada and premedical college preparation as well as first year medicine followed at the University of Toronto.

In 1917 Dr. Mulholland was placed in the Medical Reserve and assigned to the second year of medicine at the University of Virginia. Back in the south he prospered under the benign influence of a superior climate and at one time attained the position of night hospital orderly while still a third year medical student. The terrible influenza epidemic of this period required a double effort on the part of medical students and your president did his share of the extra work, his only reward at the time—a few midnight chocolate milk shakes in the hospital diet kitchens.

Graduation from the University of Virginia Medical School came in 1920 and for one year following this a rotating interneship in the University of Virginia Hospital. This led to the Residency in Medicine at the same institution for the year 1921-1922. During this year, particularly, and in subsequent years, Dr. Mulholland fell under the helpful guidance of the late Dr. James Carroll Flippin (President Medical Society of Virginia, 1932-3), a profound student and teacher of the fundamentals of medical practice. Early in his career (1923) Dr. Mulholland spent a summer with Dr. Chester Morse Jones at the Massachusetts General Hospital in Boston. Several years later, he pursued further postgraduate work for a year abroad (1927-1928) with Prof. Erich Grafe in Wurzburg and Prof. August Krogh in Copenhagen and other clinics.

Finally settling at the University of Virginia Medical School, your new president has passed through a steady advance: Student Physician and Instructor in Medicine,

1922-1927, Assistant Prof. of Medicine, 1927-1928, Associate Prof. of Medicine, 1928-1938, Professor of Practice of Medicine, 1937-to date, Assistant Dean of University of Virginia Medical School, 1942-to date, Acting Head of Department of Internal Medicine 1943-to date.

"Hank", as he is known to his many friends, has the happy characteristic of liking people and having them like him, a trait naturally acquired from a delightful mother, Mrs. Mulholland, widow of John H. Mulholland. Dr. Mulholland was married to Miss Elizabeth Brown of Rock Hill, S. C., on October 19, 1925. There are two children,

HENRY BEARDEN MULHOLLAND, M.D.,
President, Medical Society of Virginia

Betty fifteen who keeps "Hank" abreast the latest news and Jackie, a young dynamo of twelve on whom your new president depends vicariously for exercise and a place in the world of sports. Jackie has recently won a boy's tennis tournament. However, "Hank" himself is not without skill in sports, particularly of the indoor variety, and rarely is he forced to the "shuck" house on a rainy Saturday night.

Dr. Mulholland will make a good president. His capacity for work is excellent. He understands the trend of present-day problems. He realizes that the Medical Society of Virginia must offer the people of Virginia a helpful and progressive program in a chaotic postwar period. His ability, training and experience insure the conception and execution of such a program. His many friends will support heartily his plans for better postgraduate medical education and better medical care for all.

J. EDWIN WOOD, JR.

Rubella and Pregnancy

NEWS comes from Australia that German measles is not the simple and innocuous disease it was formerly thought to be. In 1941 Gregg studied a series of 78 congenital cataracts. With few exceptions the mothers gave a history of an exanthematous disease diagnosed as rubella, occurring in the early stages of their pregnancy. In 44 of these cases a congenital heart lesion was also present. Gregg's report created so much interest in the State of South Australia that a committee consisting of an internist, a pediatrician, an ophthalmologist and an otologist, was appointed to study the question. Every child born with a malformation was investigated. Swan and others reported their findings in the *Medical Journal of Australia* for September, 1943. There were 31 mothers who gave birth to children with congenital defects. All save two had contracted German measles during the first trimester of pregnancy. Nine babies had a cardiac lesion; three were probably mentally deficient; one had club feet; seven were deaf. There were also cases of microcephaly and mental retardation. Fourteen of the 31 babies had ocular defects, one a buphthalmos, 10 bilateral cataracts, and 3 unilateral cataracts. The conclusions of the committee were that, if a woman contracts rubella in the first two months of pregnancy, her chances of giving birth to a defective baby are in the neighborhood of 100 per cent, while if she contracts rubella in the third month they are about 50 per cent. Even after the third month there is still a slight possibility of her bearing a defective child. Rones (*Medical Annals of the District of Columbia,* 13:285, 1944) finds some confirmatory evidence in Washington, of the association of rubella in early pregnancy with congenital cataract. He reports four cases of Washington ophthalmologists. One mother had morbilli and three rubella. In the two cases in which the exanthem occurred in the second month of pregnancy, the infants had cataracts, while in the two cases with the disturbance in the third month, congenital glaucoma was present.

War Brides

A BRIDE is the personification of radiant happiness. In ordinary times this bride-state rarely persists. It is said that love is blind and this is the foundation for the happiness of the bride. Probably it would be more correct to say that she lives in a dream-state or dwells in a Castle in Spain. Usually in the course of months there is an awakening, more or less. Certain imperfections and unlovely traits appear in the groom and the bride is no longer a bride. If the contracting parties are sensible, the groom comes down off his pedestal and seeks his proper level in society, and the bride gets used to being less than the most adorable creature in the world. If the contracting parties are not sensible they make for the divorce court.

The war bride has the advantage of knowing that she married a hero and very rarely is she mistaken. She follows her hero back and forth across the country, putting up cheerfully with the dangers and inconveniences of wartime travel and proceeds forthwith with woman's greatest occupation—the raising of a family. The surroundings are none too favorable. She has to live in trailers or cabins or makeshift homes. She does not have the guidance of family or old friends. She is in a new, crude world of youth and must miss the protection of home. Perhaps for that very reason she starts right away to make a home of her own. If she does not promptly become pregnant,

she seeks the reason why, and attempts to correct whatever that reason may be. If she does become pregnant she is happy.

It has been our privilege to know many of these women professionally. They have come from all parts of the country—the Pacific Coast, Idaho, Montana, Utah, Colorado, the Mid-West, New England and the South. Some were G. I.'s wives and some the Colonel's lady, but invariably they were brides, i.e., happy, and it was a pleasure to be in their company. What they must mean for the morale of the army and the navy is beyond estimation. They were conscious of and proud of the part they were playing. Unwittingly, they played a great role in prevention of venereal disease, that great menace of armies since the dawn of history.

When the hero was "shipped out", the heroine—for she is a great heroine—went back to mama, but not in the spirit that that phrase formerly connoted. We cannot know, of course, what their lot was when they went home to Massachusetts, Rhode Island, New York, Colorado, etc., but those who came home to Virginia brought their radiant happiness with them. Many of them got busy helping out with the labor shortage—nursing or working in an office. In addition to their happiness, these women gave one the impression that they had developed a definite mother complex for their soldier husbands.

All too frequently a sad message from the War Department arrived about the time the baby came. They took it with Roman fortitude—just a few badly concealed tears and an evident, but not expressed, determination to live up to their new responsibility.

There has been much speculation as to what will happen to the war brides whose husbands *do* come back, and the picture that has been painted is none too bright. What the future holds for them only a prophet can say. Be that as it may, something has made of them as noble a class of women as it has been our privilege to know; and that is saying a great deal. It is the only class of stay-at-homes that has the war spirit of self sacrifice, and that in itself is worth while. It will be an interesting study to see what becomes of them. Our own guess is that they will measure up to any situation, and that they will meet it with a smile on their lips.

Floral Eponym (21)

MUSA

MUSA, ANTONIO, FL. 1ST CENTURY, B. C.

The Musaceae are the largest of tree-like herbs. They are grown for their large, striking foliage, for fruit, and for fiber. M. *sapientum* Linn. is the common banana.

Antonio Musa was a pupil of Asclepiades and was the personal physician of Augustus, the first Emperor of Rome. He cured the Emperor of liver trouble by means of hydrotherapy. This feat seemed to have gone to his head, and he had his statue erected beside that of Aesculapius. He boasted of having invented a secret remedy with which he kept Caesar and Maecenas in good health. He prescribed excrement of dogs for angina, maintained that he was able to pulverize stones inside the bladder, and regarded the herb betony (Stachys Betonica, Benth.) as a sovereign remedy for all diseases. He numbered among his patients besides Augustus, Virgil, Horace, Maecenas and Marcus Agrippa.

Societies

The Augusta County Medical Association

Held its regular quarterly meeting at Staunton on August 2, at which time papers were read by Dr. George H. Kinser of Waynesboro on Disability Wage Plans Practiced by the du Pont Company, and by Dr. John H. Guss of Staunton on Gold Salts in the Treatment of Rheumatoid Arthritis. At the business session, the following were elected as officers for the coming year: President, Dr. J. Hansford Thomas of Greenville; vice-presidents, Drs. George H. Kinser of Waynesboro, C. W. Putney of Staunton, and G. E. Stone of Staunton; secretary, Dr. John H. Guss; treasurer, Dr. J. E. Womack; and censor, Dr. Glenn C. Campbell, all of Staunton.

Patrick Henry Medical Society.

On October 13, this Society held its regular quarterly meeting in Martinsville. A Diphtheria Prevention Program sponsored by the Charity League of Martinsville for the local schools was endorsed by the Society.

Election of officers for the ensuing year resulted as follows: President, Dr. E. N. Shockley, Bassett; vice-president, Dr. B. A. Hopkins, Stuart; and secretary-treasurer, Dr. T. H. Dickerson, Martinsville.

After the business meeting Dr. Fred E. Hamlin of Roanoke gave a very interesting discussion on "The Nose and Its Relation to the Practice of Medicine".

The Tazewell County Medical Society

Met in North Tazewell on September 28, with the President, Dr. J. W. Witten, presiding. The following officers were elected to serve for the next twelve months: President, Dr. C. G. Bennett, Bishop; vice-president, Dr. A. D. Parson, Richlands; and secretary-treasurer, Dr. J. A. Robinson, Richlands.

A highly instructive and interesting paper entitled "Pregnancy Complicated by Diabetes Mellitus" was presented by Dr. Mary Elizabeth Johnston of Tazewell.

Wise County Medical Society.

The first fall meeting of this Society was held at Norton on September 22, under the presidency of Dr. Glen Foster, Stonega. The members were guests of the Norton doctors at a dinner, followng which the scientific program was presented. Dr. Bruce Powers, Knoxville, Tennessee, spoke on "The Treatment of Congestive Heart Failure". This was discussed by Drs. F. E. Handy, Appalachia, and R. L. Phipps, Clintwood. Dr. Richard Waterhouse, also of Knoxville, spoke on "The Management of Head Injuries", and Dr. G. B. Setzler, Pennington Gap, lead the discussion. There was then a general round-table discussion of interesting medical and surgical topics among the doctors.

The next meeting of the Society will be held in Coeburn. Dr. W. B. Barton, Stonega, is secretary-treasurer.

News

Medical Society of Virginia.

As we go to press, the Society has just ended a most successful meeting in Richmond, under the presidency of Dr. C. B. Bowyer of Stonega. There were 570 doctors registered in addition to a large number of medical students, ladies and exhibitors. At the closing session, Dr. H. B. Mulholland of the University of Virginia succeeded to the presidency. Other officers to serve with Dr. Mulholland are: President-elect, Dr. Julian L. Rawls of Norfolk, and vice-presidents, Dr. Harvey B. Haag of Richmond, Dr. Philip S. Smith of Abingdon, and Dr. William R. Whitman of Roanoke. Councilors were elected for the even numbered districts as follows: 2nd, Dr. C. Lydon Harrell of Norfolk; 4th Dr. James L. Hamner of Mannboro; 6th, Dr. James R. Gorman of Lynchburg; and 8th, Dr. J. E. Knight of Warrenton. Dr. J. Morrison Hutcheson of Richmond was elected to succeed himself as delegate to the American Medical Association for a term of

two years with Dr. Carrington Williams as his alternate.

An invitation from the Roanoke Academy of Medicine was unanimously accepted to hold the 1945 meeting in Roanoke.

Medical College of Virginia Commencement. The commencement exercises of the one hundred seventh session of the Medical College of Virginia were held on September 23. Honorable J. Melville Broughton, A.B., LL.D., Governor of North Carolina, delivered the commencement address. The Doctor of Science degree, the only honorary degree to be awarded by the College this year, was presented to Dr. John Shelton Horsley of St. Elizabeth's Hospital, Richmond.

There were 167 graduates, 77 being in medicine, 30 in dentistry, 6 in pharmacy, and 53 in nursing, and 1 receiving the Master of Science degree. The following are graduates in medicine with their hospital appointments:

MEDICAL COLLEGE OF VIRGINIA, Richmond—Drs. Jane Beery Adams, Harrisonburg; Raymond Atwell Adams, Redoak; Federico Diez-Rivas, Caguas, P. R.; Hubert Taylor Dougan, Malta, Ohio; Gershon Gerald Ediss, Norfolk; Cecil Glen Finney, Richmond; Claude Albee Frazier, Winona, W. Va.; Edgar Clyde Garber, Jr., Greensboro, N. C.; Frank Wilson Gearing, Jr., Woodstock; Harold Goodman, Richmond; Marguerite Elizabeth Kersey, Bluefield, W. Va.; William Ward Kersey, Jr., Bluefield, W. Va.; Wallace Byron Lilly, Beckley, W. Va.; Ray Atkinson Moore, Jr., Hampden-Sydney; William Philip Morrissette, Midlothian; Eugene Goodbred Peek, Jr., Ocala, Fla; William Anderson Sadler, Mathews; Oscar Orton Smith, Jr., Independence; Harry Yandell Spence, Berkeley, Calif.; James Tidler, Clarksburg, W. Va.; and Robert Palmer Trice, Richmond.

JOHNSTON-WILLIS HOSPITAL, Richmond — Drs. William Branch Bishop, Kenbridge; Charles Dotson Houck, Lewisburg, W. Va.; and Ray Donald Minges, Greenville, N. C.

THE TUCKER HOSPITAL, Richmond—Dr. Harry George Edward Stoeckle, Jr., Sturgis, Mich.

STUART CIRCLE HOSPITAL, Richmond—Dr. John Barrett Walker, Jr., Burlington, N. C.

LEWIS-GALE HOSPITAL, Roanoke — Drs. James William Lambdin, Rocky Mount; and Evelyn Clark Wade, Huntington, W. Va.

DE PAUL HOSPITAL, Norfolk—Dr. Nelson Saunders Payne, Norfolk.

CHESAPEAKE AND OHIO HOSPITAL, Huntington, W. Va.—Drs. Joel Foster Carr, Princeton, W. Va.; Otis Wilson Corder, Jane Lew, W. Va.; and Robert Russell Dennison, Huntington, W. Va.

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CITY MEMORIAL HOSPITAL, Winston-Salem, N. C. —Dr. Robert Glenn Holt, Lexington, N. C.

REX HOSPITAL, Raleigh, N. C.—Drs. Robert Henry Thrasher, Norfolk; and Charles Baynes Wilkerson, Jr., Raleigh, N. C.

DOCTORS HOSPITAL, Washington, D. C.—Dr. Earle McKenzie Bane, Charles Town, W. Va.

STATE OF WISCONSIN GENERAL HOSPITAL, Madison, Wis.—Drs. David Scott Berkman, Rochester, Minn.; and Merritt Woodhull Foster, Jr., Williamsburg.

NEW YORK CITY HOSPITAL, New York, N. Y.—Dr. Gustaf Walter Erickson, Jr., Springfield, Mass.

CONEY ISLAND HOSPITAL, Brooklyn, N. Y.—Dr. Marcus Nakdimen, Abingdon.

BETH ISRAEL HOSPITAL, New York, N. Y.—Dr. Richard Dick Turin, Brooklyn, N. Y.

CUMBERLAND HOSPITAL, New York, N. Y.—Dr. Abraham Perlman, New York, N. Y.

BOSTON CITY HOSPITAL, Boston, Mass.—Drs. Oscar Withers Clarke, Petersburg; and Martin Markowitz, Brooklyn, N. Y.

VIRGINIA MASON HOSPITAL, Seattle Wash.—Dr. Rufus Purdum Ellett, Jr., Roanoke.

ST. VINCENT'S HOSPITAL, Jacksonville, Fla.—Drs. Arthur Lawson Hardie, Jr., Danieltown; and Dr. John David Lindner, Ocala, Fla.

HOSPITAL FOR WOMEN OF MARYLAND, Baltimore —Drs. Joseph Frasia Jones, Jr., Richmond; and Jean Fennell Wine, Harrisonburg.

UNION MEMORIAL HOSPITAL, Baltimore, Md.—Dr. Samuel Woolston Lippincott, Jr., Baltimore.

KNOXVILLE GENERAL HOSPITAL, Knoxville, Tenn. —Dr. Herman Melvin Kunkle, Portsmouth.

BAYAMON CHARITY DISTRICT HOSPITAL, Bayamon, P. R.—Dr. Jenaro Gerardo Scarano-Scarano, Ponce, P. R.

SOUTHERN BAPTIST HOSPITAL, New Orleans, La. —Dr. Walter Richmond Wilkinson, Huntington, W. Va.

ROBERT PACKER HOSPITAL, Sayre, Pa.—Dr. Joseph Franklin Wilson, Richmond.

NAVAL INTERNSHIPS

UNITED STATES NAVAL HOSPITAL, NOB, Norfolk—Drs. Leon Harper Alexander, Petersburg; Norris Scribner Erb, Jones Mills, Ark.; and Gervas Storrs Taylor, Richmond.

NORFOLK NAVAL HOSPITAL, Portsmouth—Drs. Robert Frederick Bondurant, Roanoke; Gordon Fletcher Harrell, Norfolk; William Donald Moore, Cary N. C.; and Elmer Walter Rice, Jr., Richmond.

NAVAL HOSPITAL, National Naval Medical Center, Bethesda, Md.—Drs. Sydenham Benoni Alexander, Charlotte, N. C.; and Roy Turnage Parker, Pinetops, N. C.

UNITED STATES NAVAL HOSPITAL, San Diego, Calif.—Dr. James Allen Farley, Huntington, W. Va.

UNITED STATES NAVAL HOSPITAL, Mare Island, Calif.—Dr. John Milton Gouldin, III, Tappahannock.

UNITED STATES NAVAL HOSPITAL, Oakland, Calif.—Drs. Thomas Carroll Iden, Berryville; and William Sanford Terry, Chatham.

UNITED STATES NAVAL HOSPITAL, Key West, Fla.—Dr. Robert Gwynn Schultz, Richmond.

UNITED STATES NAVAL HOSPITAL, Philadelphia, Pa.—Dr. Hal Waugh Smith, Montgomery, W. Va.

UNITED STATES NAVAL HOSPITAL, St. Albans, N. Y.—Dr. Charles Edward Woodson, Jr., North Garden.

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UNITED STATES MARINE HOSPITAL, Norfolk—Drs. Jack Stone Shaver, Woodstock; and Robert Craig Shelburne, Christiansburg.

UNITED STATES MARINE HOSPITAL, Baltimore, Md.—Drs. Marion Lee Rice, Jr., Richmond; and Christian Fogle Siewers, Winston-Salem, N. C.

UNITED STATES MARINE HOSPITAL, New Orleans, La.—Dr. Edward Nisbett Maxwell, Richmond.

Dr. Walter Augustus Eskridge, Marlinton, W. Va., was also a graduate in the Department of Medicine.

The Sixth War Loan Is Coming Up

And the help of every one is needed in putting it over. The European fighting will cost much, long after the fighting stops, and the war against Japan is just entering the "all-out" stage and will cost more. The same amount of freight to the Pacific area costs 25 per cent more, and it takes twice as many ships to move the same amount. Long range B-29's cost $600,000 each, or twice the cost of the biggest previous bomber. By investing in War Bonds, you hasten the day of unconditional surrender and help shorten casualty lists. Your money invested during the Sixth War Loan drive works for your boy and girl in service as well as for you. Buy liberally.

Southern Medical Association.

Just a reminder of dates for the meeting of the Association in St. Louis—November 13, 14, 15 and 16—with Dr. James A. Ryan of Covington, Ky., presiding. All meetings and exhibits will be held in the Municipal Auditorium, which is in easy walking distance of a number of hotels. A large attendance is expected.

The Southern Chapter, American College of Chest Physicians

Will have its annual meeting in St. Louis, at the time of the meeting of the Southern Medical Association, November 13-16. The DeSoto is to be hotel headquarters. An interesting program will be given, and several social affairs have been arranged. Dr. Paul H. Ringer of Asheville, N. C., is president, and Dr. Benjamin L. Brock of Waverly Hills, Ky., secretary-treasurer.

Dr. A. I. Dodson,

Richmond, read a paper on "The Management of Nephroptosis" before the International Post-Graduate Association of North America, in Chicago, on October 17. He also spoke before the North Central Section of the American Urological Association on the 19th, his subject being "Renal Pathology Resulting from Nephroptosis with a Report of Cases".

Dr. R. W. Quaintance,

Who practiced for sometime at Lundale, West Virginia, has returned to his former home at Slate Mills, Virginia.

Annual Post-Graduate Course at University of Virginia.

Elsewhere in this issue, is given program for the eleventh annual Post-Graduate Course in Diseases of the Eye, Ear, Nose and Throat, which will be held at the University of Virginia Hospital in Charlottesville, on Tuesday, Wednesday, Thursday and Friday, December 5, 6, 7 and 8. The fee for the course will be $5.00 a day. Further information in

regard to this may be obtained from Dr. Fletcher D. Woodward, Box 98, Charlottesville, Va.

Married.

Dr. James Guy Price, Norfolk, and Miss Beatrice Hope Watkins, South Hill, September 10th. Dr. Price received his medical degree from the University of Virginia in March 1943 and is now at the University Hospital.

Dr. William Gordon Leary, Jr., of the December 1943 class of the University of Virginia, and Miss Margaret Conley of Cincinnati, September 21. Dr. Leary recently completed his internship at Cincinnati General Hospital and has reported for service with the United States Navy.

Lt. (jg) Richard Albert Bagby, Richmond, and Miss Frances Otwell, Cumming, Ga., October 5th. Lt. Bagby is a graduate of the Medical College of Virginia, class of December 1943.

Lt. John David Lindner, MC., Ocala, Fla., and Miss Billie Wyatt Morris, Roanoke, September 24th. Dr. Lindner is a graduate of the Medical College of Virginia, class of September 1944.

Lt. Walter Erickson, Jr., MC., Springfield, Mass., and Miss Martha Lake Adams, Norwalk, Conn., September 24th. Lt. Erickson is a member of the class of September 1944, Medical College of Virginia.

Lt. (jg) Thomas Carroll Iden, Berryville, and Miss Mae Oglesby Tench, Pulaski, September 26th. Lt. Iden is also a member of the September 1944 class of the Medical College of Virginia.

Dr. E. Claude Jamison

Has received an honorable discharge from the U. S. Army and has resumed his former practice in Rocky Mount. He was released because of the need for medical care in Franklin County.

Jefferson Medical College.

The one hundred twentieth annual commencement was held on September 22nd at which time the address was delivered by Franklin B. Snyder, LL.D., President of Northwestern University on "An Incident in the History of Fort Ticonderoga". The present graduating class of 135 members brings the total number of graduates up to 17,355.

The annual alumni dinner was held on the 21st at the Bellevue-Stratford Hotel, with four hundred and fifty alumni in attendance.

Dr. Paul E. Brady,

Class of '43, Medical College of Virginia, has completed his internship at the University Hospital, Columbus, Ohio, and is now resident in surgery at the Grant Hospital, that city.

Dr. J. Langdon Moss,

Class of December 1943, University of Virginia, has completed his internship at Emory University Hospital, Emory, Georgia, and has entered the Navy as Lieutenant (jg) USNR. He is stationed at the Naval Air Station Hospital in Jacksonville, Fla.

Dr. Brown Honored.

Dr. George W. Brown of Williamsburg has been honored by Webster University of Atlanta, Georgia, through its President, by having conferred upon him the honorary degree of Doctor of Laws. It was stated that this was done in recognition of his work as a medical doctor, psychiatrist, church official, organizer and humanitarian.

Dr. William C. Barr, Jr.,

Formerly of East Falls Church, has moved to Stuart, Florida, where he will practice for the duration under the War Emergency Relief Plan.

Dr. Oliver L. Jones

Is located for general practice in the Harvey Building, at West Palm Beach, Florida. He was formerly of Hopewell.

For Sale.

Located in Virginia, the following: One Fischer Portable X-Ray, Model H, No. 4125, 65 Kv., 10MA, shockproof, oil-immersed tube. Also, one floor model Peerless short wave, with complete electro-surgical outlets. Write D. B. Phelps, D.S.C., 602 W. Hastings, Vancouver, B. C., Canada. (*Adv.*)

For Sale.

One Luxor B. Alpine Lamp in good condition. Shenandoah Valley National Bank, Winchester, Virginia. Executor of Estate of J. E. Harris, deceased. (*Adv.*)

Fountain Pen Found.

Some one registering at Richmond meeting of State Society left a fountain pen at Registration desk. Will be returned to owner upon request to this journal, 1200 East Clay Street, Richmond, 19. (*Adv.*)

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Va. Orthopedic Society	J. B. Dalton, Richmond	J. T. Tucker, Richmond	Richmond, Oct. 23-25, 1944.
Va. Pediatric Society	E. A. Harper, Lynchburg	Emily Gardner, Richmond	Richmond, Oct. 23-25, 1944.
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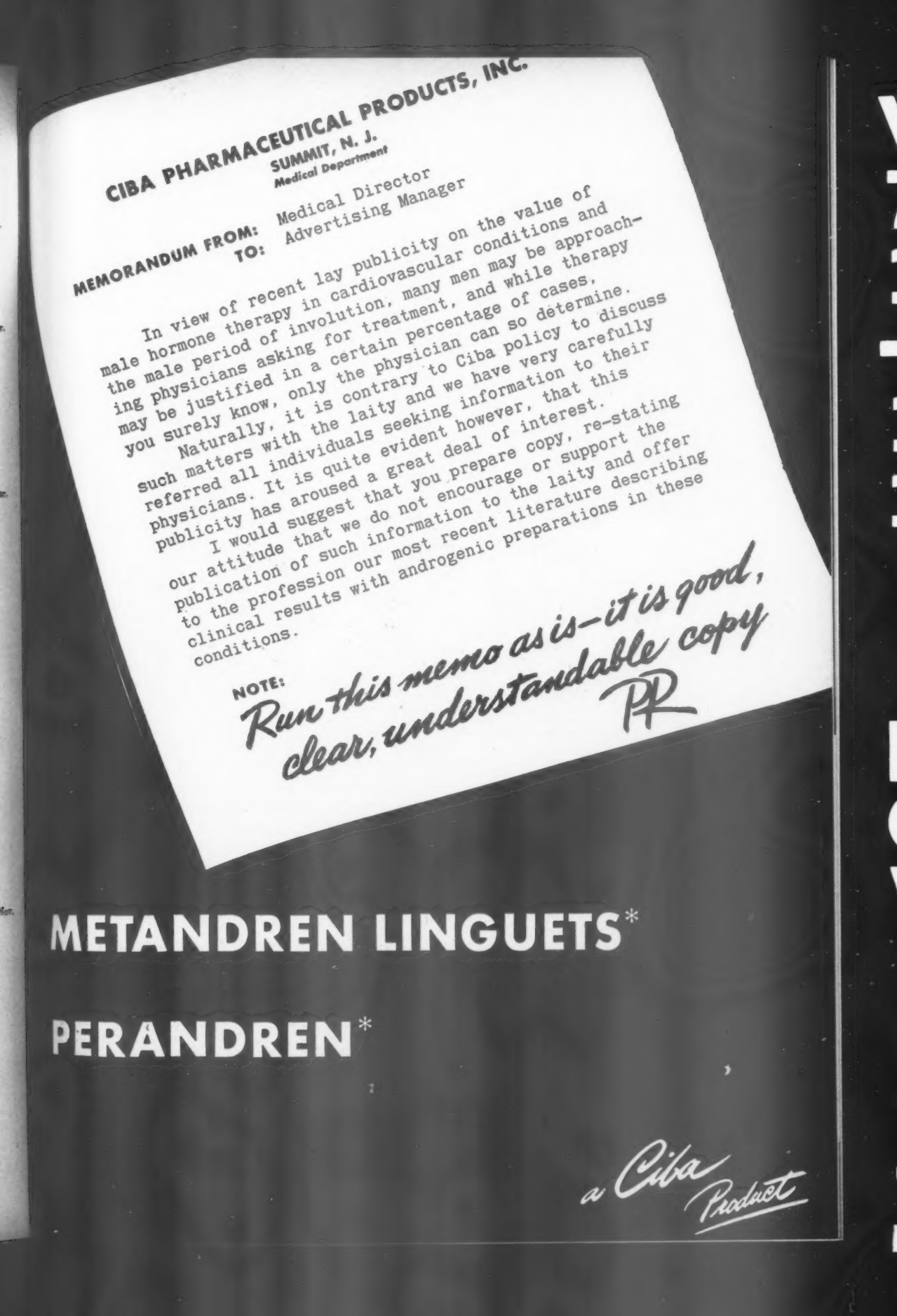
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*Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154. Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60. Proc. Soc. Exp. Biol. and Med., 1934, 32, 241. N. Y. State Journ. Med., Vol. 35, 6-1-35, No. 11, 590-592.

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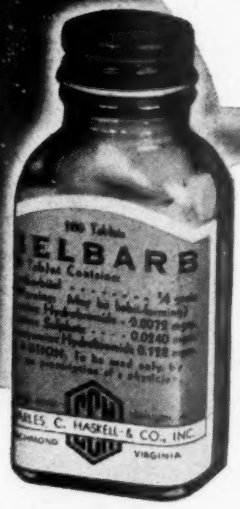

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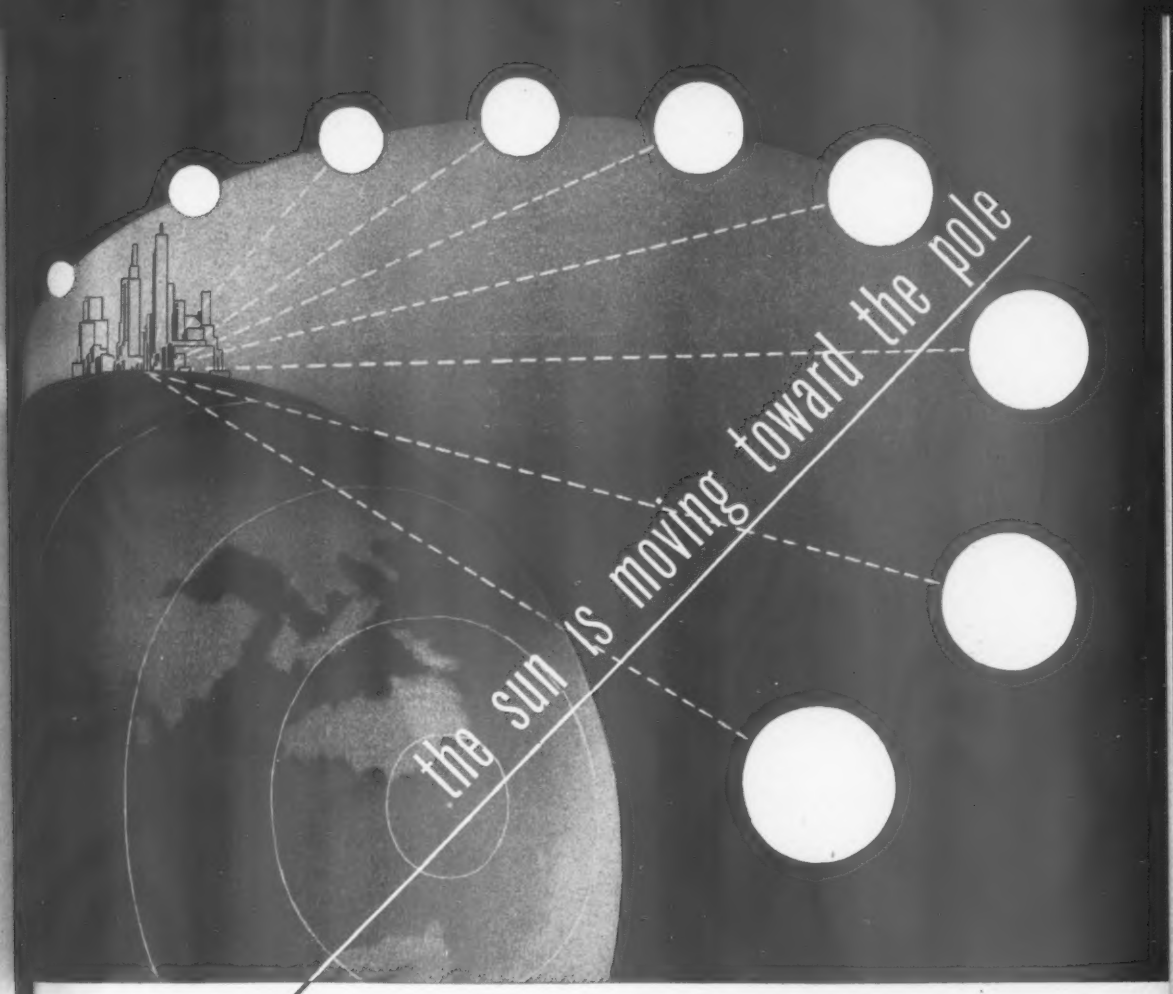

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*Youmans, J. B.: Nutritional Deficiencies, Lippincott, New York, 1941.

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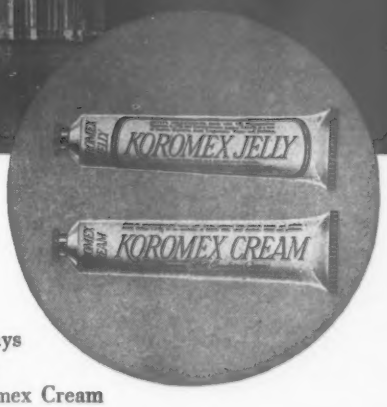

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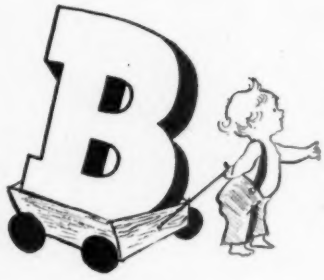

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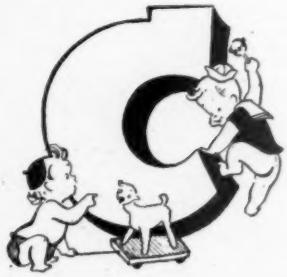

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"... at least from 200 to 300 grams of protein is needed for replacement alone. One must give the patient as much food as he can take . . . give him a good protein, one that contains all of the essential amino acids." (Elman, R.: Physiologic Problems of Burns, J. Missouri M. A. 41:1 [Jan.] 1944.)

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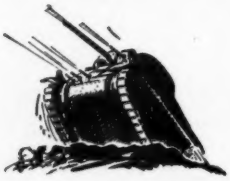

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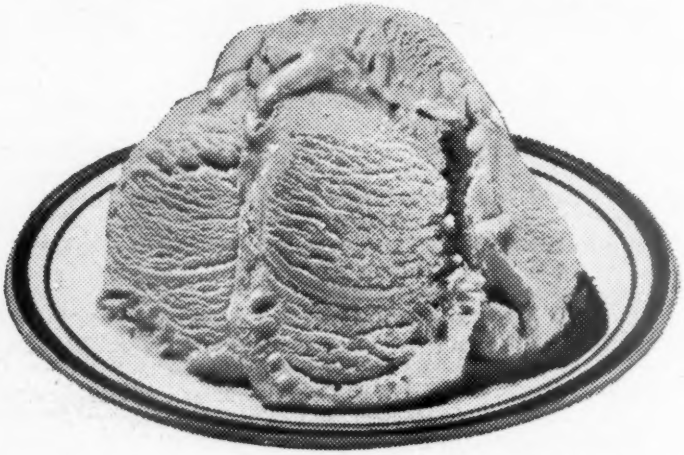

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FOR SAFE RETURN TO "HABIT TIME"

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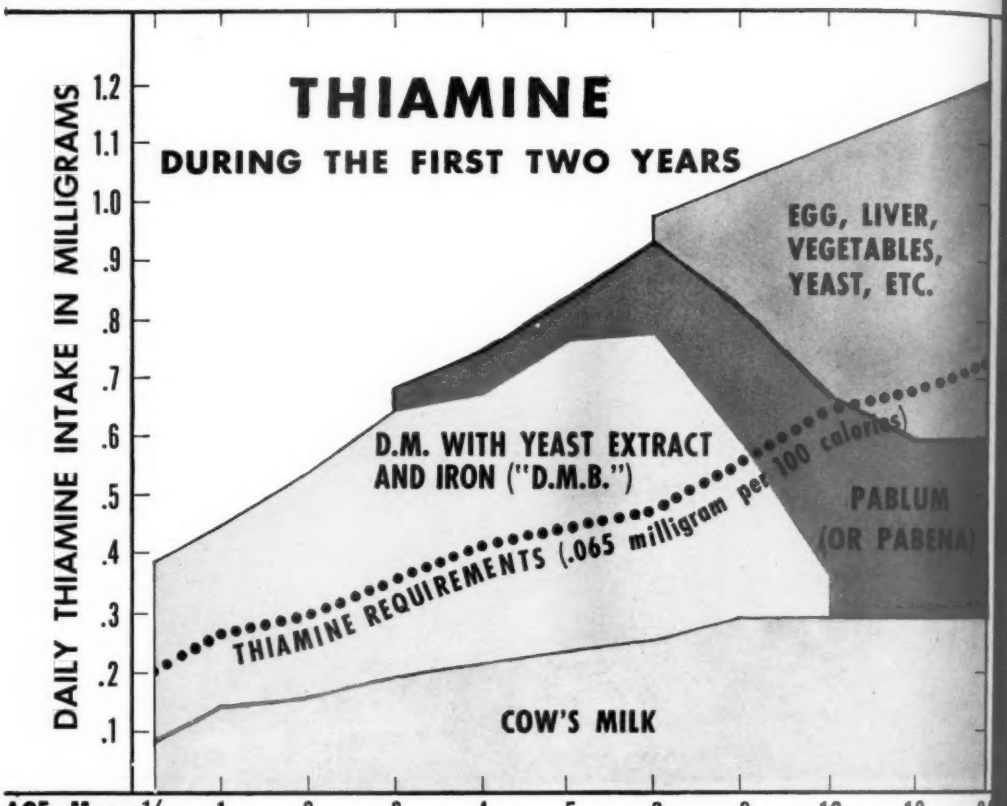

AGE, Mos.	¼	1	2	3	4	5	6	9	12	18	24
WEIGHT, Lbs.	7	9	10	12	14	15	16	19	22	23	25
MILK, Oz.	10	16	18	21	24	26	28	32	32	32	32
"D.M.B.," Oz.	1	1	1¼	1½	1½	1¾	1¾	1	¼	0	0
PABLUM, Oz.	0	0	0	⅛	¼	¼	½	¾	1	1	1

THIAMINE DURING THE FIRST TWO YEARS

Thiamine functions as a component of a cellular respiratory enzyme system, and is necessary for the complete combustion of carbohydrate. Complete thiamine deficiency eventually results in beriberi, which happily is seldom seen in America. However, authorities agree that partial thiamine deficiency in this country is widespread.

In clinical practice, it is desirable to allow a liberal margin of safety over calculated requirements. The chart shows that this safety factor may be assured when the carbohydrate is "D.M.B." and the cereal is either Pablum or Pabena.

MEAD JOHNSON & COMPANY, EVANSVILLE 21, INDIANA, U.S.A.

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